

Dr. Josef Stefan

I.

Rechnik

I. S. 90/91 Arnoldshorst

$$\begin{array}{r} 9'4 \\ 1'4 \\ \hline 8 \end{array}$$

~~$$8 : 9 = 1'2$$~~

$$\begin{array}{r} 9' \\ 18'4 \\ 10'4 \end{array} \left\{ \begin{array}{l} 9'4 \\ 8 \end{array} \right.$$

$$\frac{9'4}{8} = 1'2$$

$$\begin{array}{r} 10 \\ 24 \end{array} \left\{ 14 \right.$$

$$18'8 \left\{ 5'2 \right.$$

$$14 : 5'2 = 2'8$$

$$46^L$$

$$55'40'2 : 50'75 = \underline{1'0621}$$

$$3152$$

$$107$$

$$6$$

$$4'30$$

$$4'59$$

$$55'92 : 50'75 = 1'062$$

$$317$$

$$18$$

$$3$$

$$4'59 : 4'30 = \underline{1'067}$$

$$29$$

$$3$$

5. : 2 = 9.1 BJ

21

2 = 5 : 9 = 0.5555

8 x 20

105 $\times 100 = 10500$ 10500

837 $\times 30 = 25110$

~~105~~

105 $\times 10 = 1050$

105 = calories = 10500

105 $\times 100 = 10500$ $\times 10 = 105000$

837

837 $\times 100 = 83700$

837 $\times 100 = 83700$

837 $\times 100 = 83700$

105



105 $\times 100 = 10500$



105 $\times 100 = 10500$

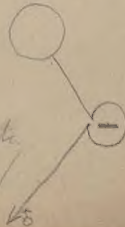
105 $\times 100 = 10500$

105 $\times 100 = 10500$

105 $\times 100 = 10500$

105 $\times 100 = 10500$

105 $\times 100 = 10500$



105 $\times 100 = 10500$

Statik & Dynamik

T

4 & 100; 100 & 100 & 100 & 100

Differential-R. von Newton & Leibniz

Yang [100 & 100]

Discussion Yang:

$$s = at^2 + bt + c \quad \text{u. } s \text{ gegen } t$$

$$s = a \sin \alpha t \quad \text{u. } s \text{ gegen } t$$

$$v = \frac{ds}{dt} = a \cos \alpha t \quad \text{u. } v \text{ gegen } t$$

$$a = \frac{dv}{dt} = -\alpha a \sin \alpha t \quad \text{u. } a \text{ gegen } t$$

u. f gegen t

$$v = \frac{ds}{dt} = a \cos \alpha t \quad \text{u. } v \text{ gegen } t$$

u. f gegen t

$$a = \frac{dv}{dt} = -\alpha a \sin \alpha t \quad \text{u. } a \text{ gegen } t$$

$$v = at$$

$$s = \int v(t) dt$$

p. 100

f. 100. Babilei M.

22. f. 100. Babilei M. -

5 -

2. f. 100. Babilei M.

22. f. 100. Babilei M. -

f. 100. Babilei M.

22. f. 100. Babilei M. -

f. 100

22. f. 100. Babilei M.

22. f. 100. Babilei M.

f. 100

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22. f. 100. Babilei M.

22. f. 100. Babilei M.

22. f. 100. Babilei M.

Kinematik [Geometrie d. Weges]

3 Kuppel'schen!

Central

2) Gravitations / in Kepler'schen /

у 20; 500

Polar-Coordination.

↳ = Gravitations / = Kepler'schen / = Polarisword.

26/11 102 ~ fsg 27g, gung st. d. m. r. d. m.
 ~ fsg 27g, gung st. d. m. r. d. m.

27/11
 my fsg 2 / 4 fsg 2 y [27/11]
 1/12 / 2/12

28/11

I. fsg

II fsg d. fsg 27g, gung st. d. m. r. d. m.

27/11 a). Hypoth. $f(u) = u$ } fsg 27g, gung st. d. m. r. d. m.
 b). - $f(u) = u^2$

28/11 a). fsg 27g, gung st. d. m. r. d. m.
 b). fsg 27g, gung st. d. m. r. d. m.

2/12

c). Hyp. $f(u) = u^2$; max. fsg 27g, gung st. d. m. r. d. m.

3/12 } ~ fsg 27g, gung st. d. m. r. d. m. [27/11]

4/12 } ~ fsg 27g, gung st. d. m. r. d. m.
 ~ fsg 27g, gung st. d. m. r. d. m.

Die Kraftfunktion

$U = \frac{1}{2} \int \rho \phi \, dV$

potentielle & kinetische Energie, (elektrische Energie)

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

noch für jede Art von

Zustand der Ladung & Strom

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

Zustand der Ladung & Strom

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

(elektrische Energie)

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

Elektrische Energie

$\frac{1}{2} \int \rho \phi \, dV$

(elektrische Energie)

$\frac{1}{2} \int \rho \phi \, dV$

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

$\frac{1}{2} \int \rho \phi \, dV = \frac{1}{2} \int \rho \phi \, dV$

14/1 21.1.1 2 26.1.1

21.1.1 26.1.1

21.1.1 26.1.1

15/1 21.1.1 26.1.1

16/1 21.1.1 26.1.1

21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

20/1 21.1.1 26.1.1

21.1.1 26.1.1

21/1 21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

22/1 21.1.1 26.1.1

21.1.1 26.1.1

23/1 21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

(20.1.1)

21.1.1 26.1.1

24/1 21.1.1 26.1.1

25/1

26/1 21.1.1 26.1.1

27/1 21.1.1 26.1.1

28/1 21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

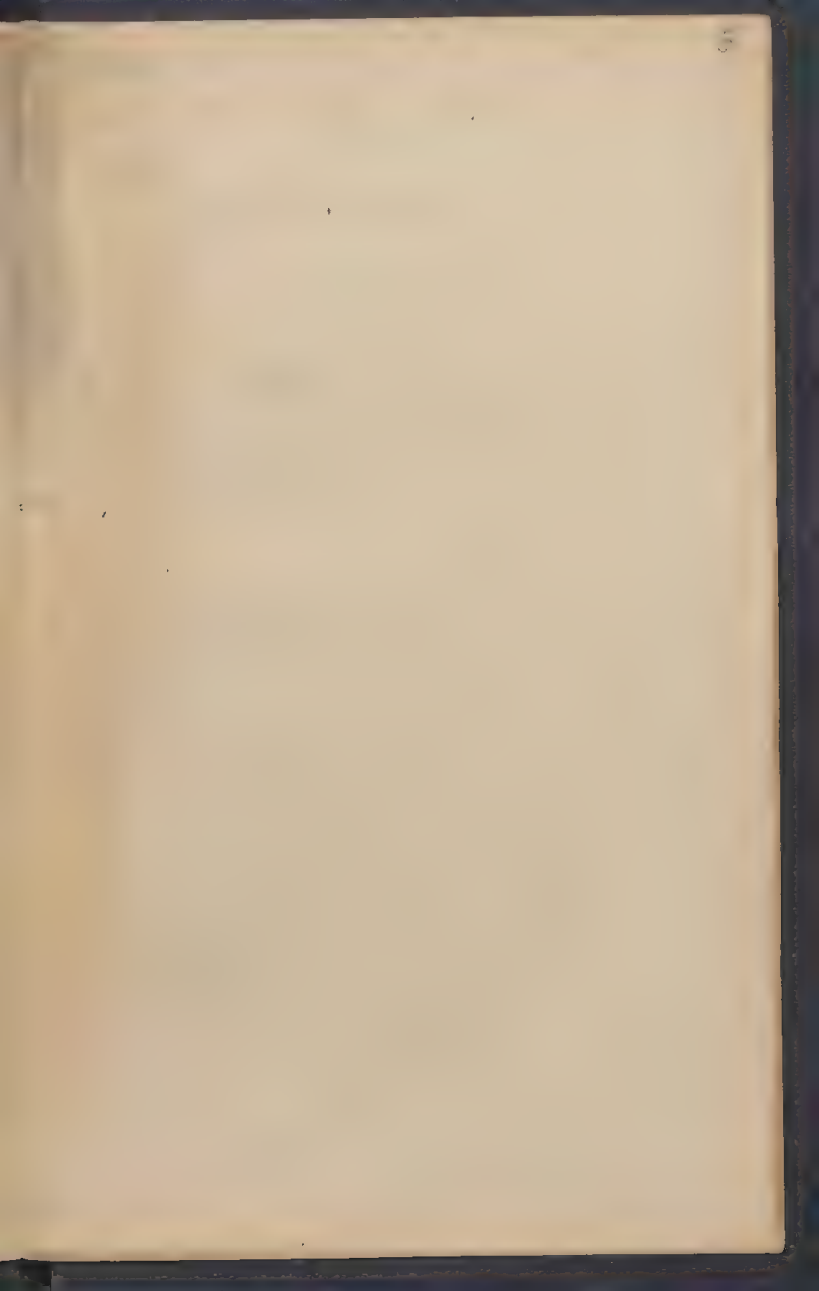
29/1

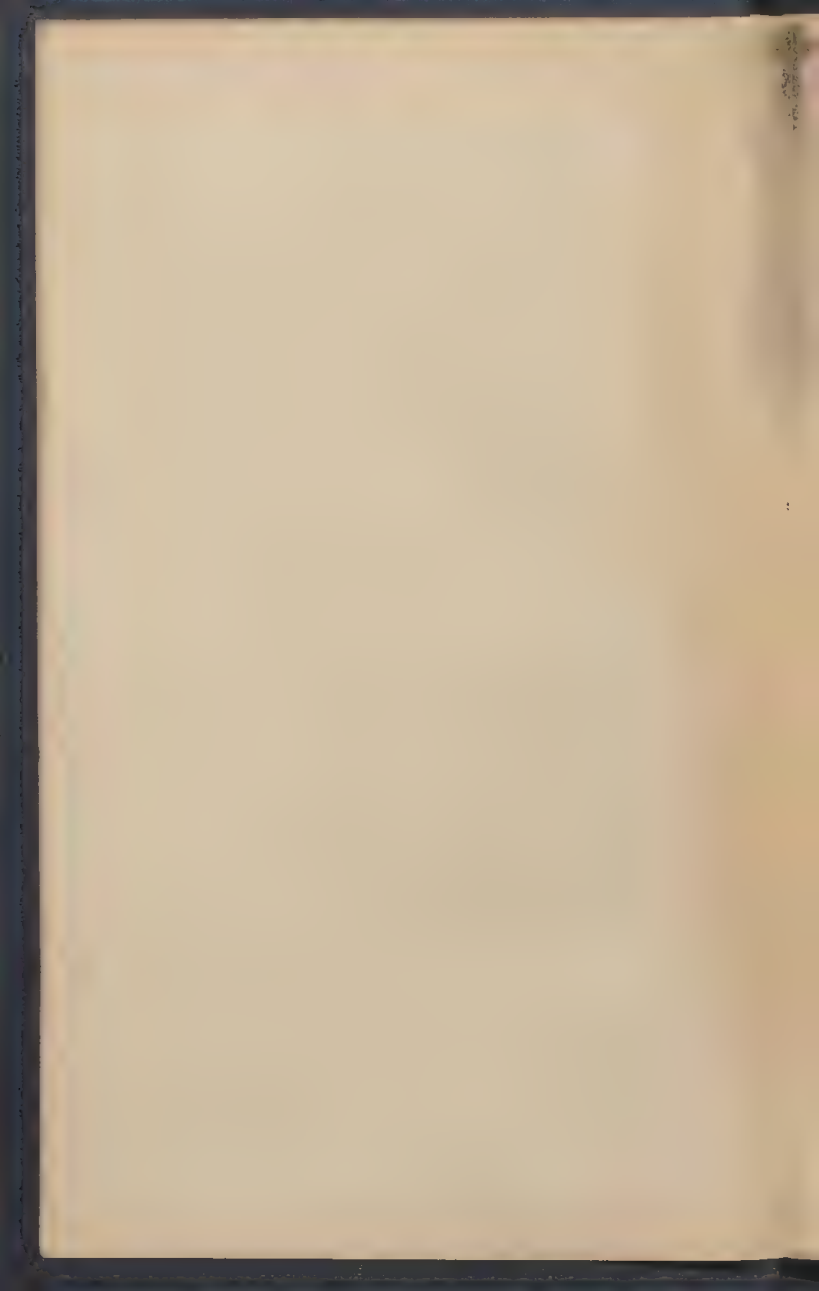
30/1

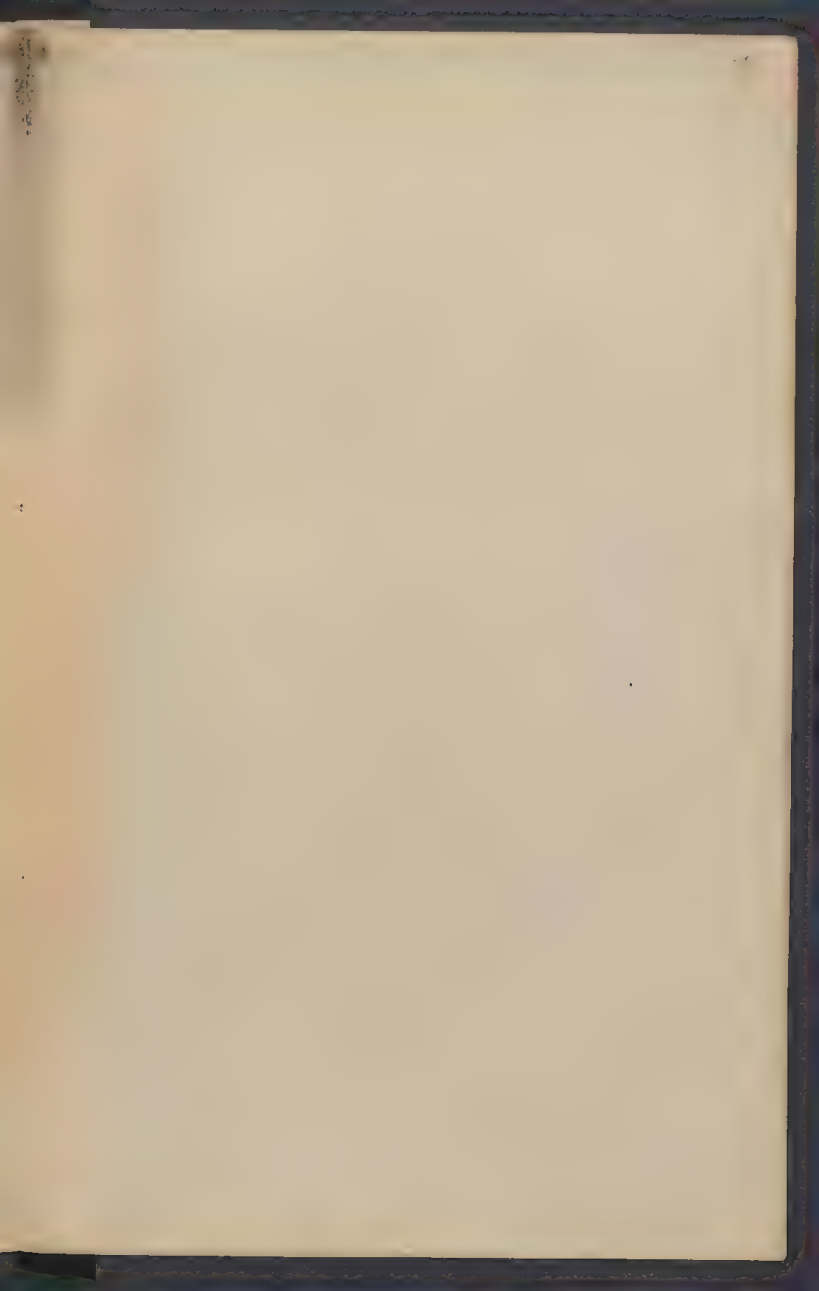
31/1 21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

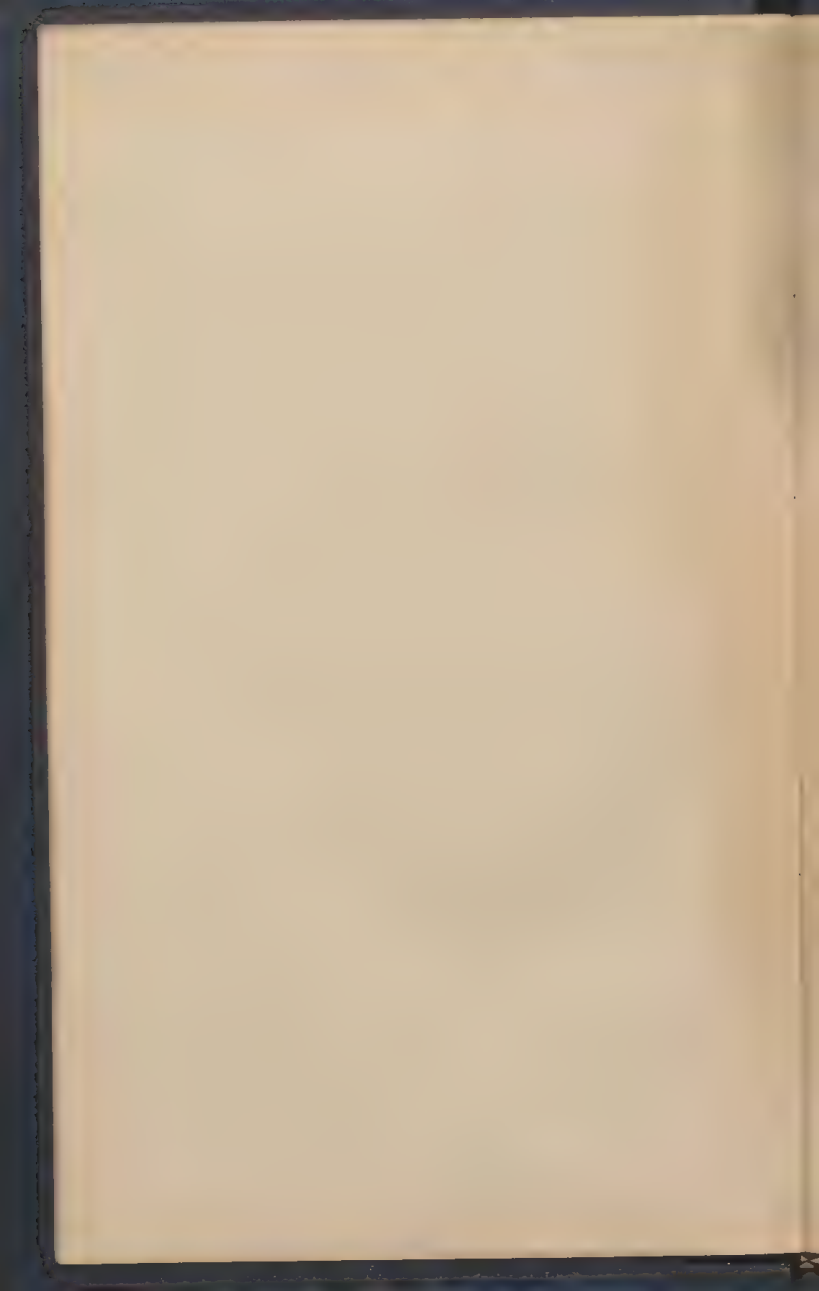
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12/2 21.1.1 26.1.1 27.1.1 28.1.1 29.1.1 30.1.1 31.1.1

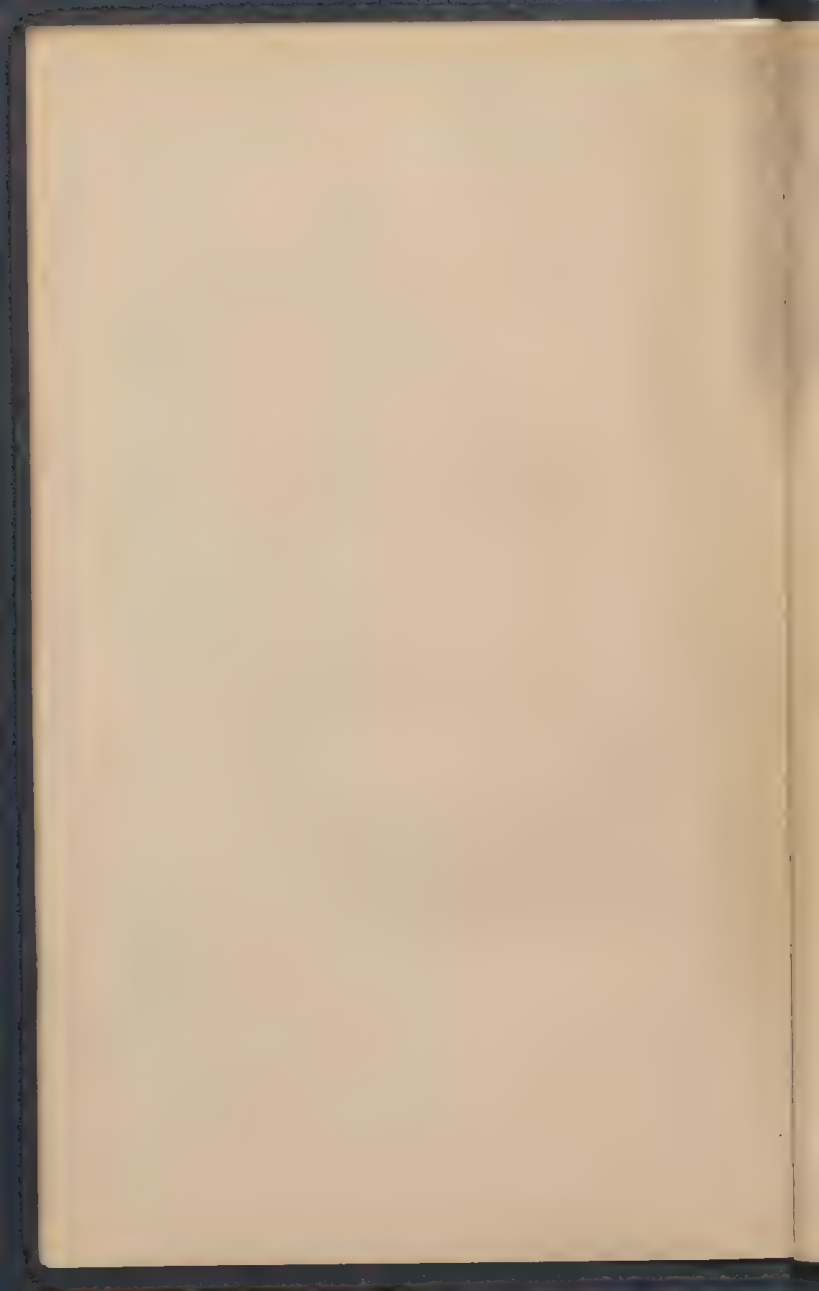


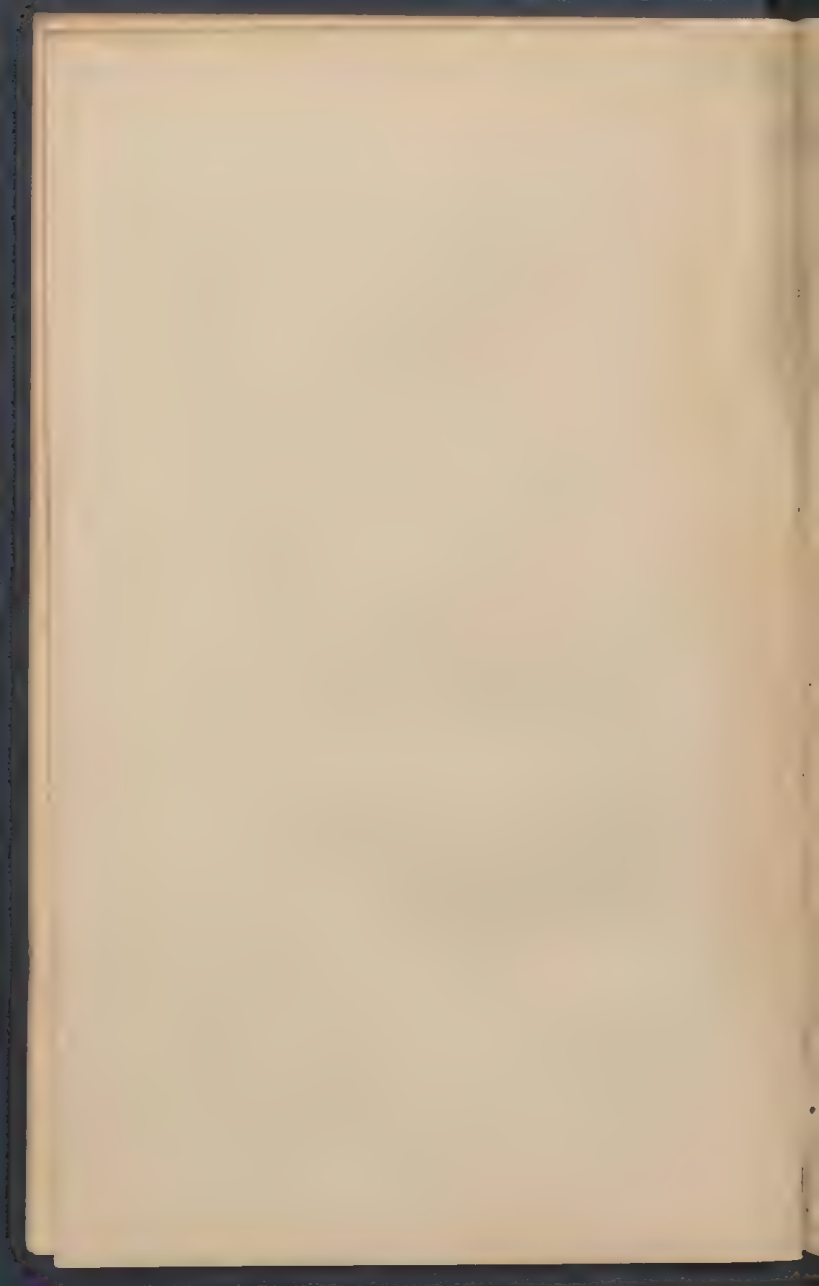














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256

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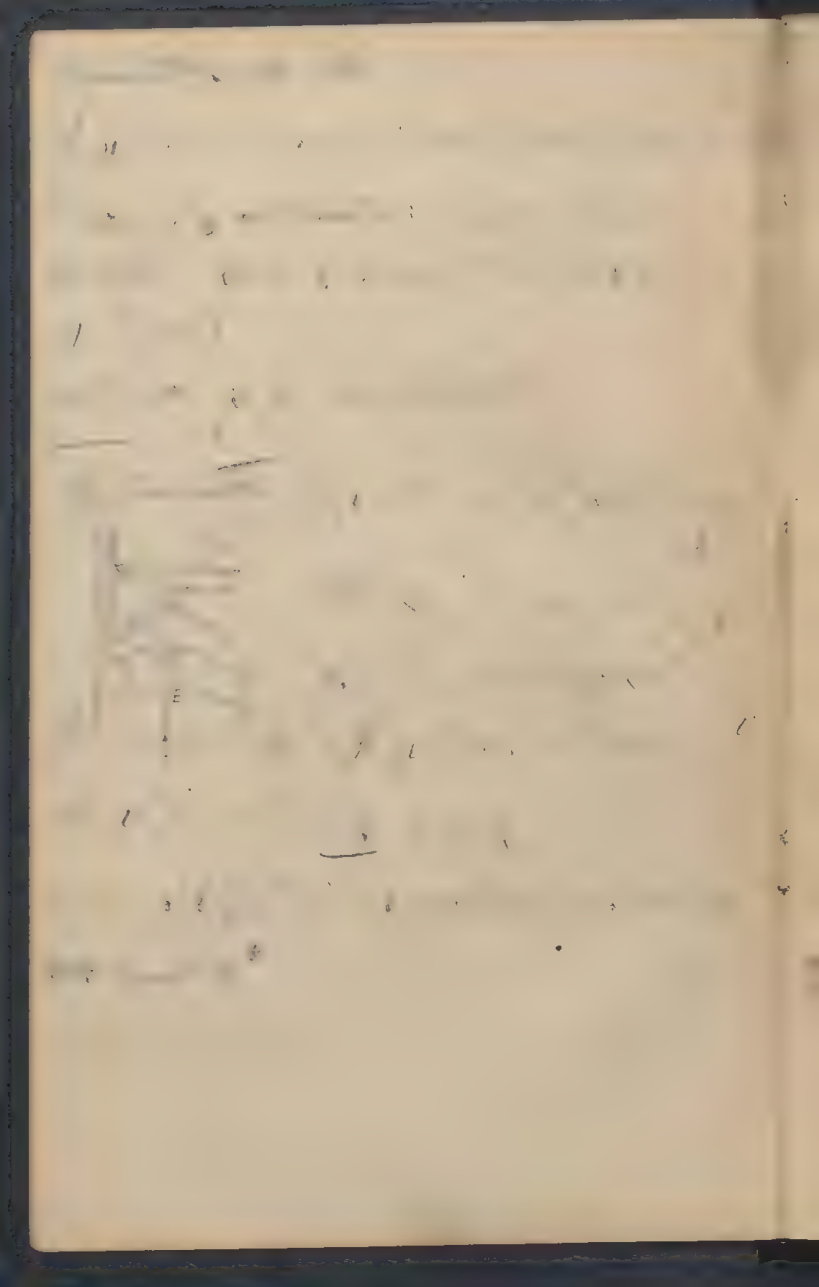
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21.

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6



10

✓

28 - 10 - 1911

$$\frac{1}{2} = \frac{1}{2}$$

$$1 = 1$$

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$= n \cdot \frac{1}{2} \cdot \frac{1}{2}$$



17

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101

102

△

$$S_{11} = 0.1$$

$$S_{12} = 0.1$$

$$S_{13} = 0.1$$

$$\begin{aligned} \text{[unclear]} &= \text{[unclear]} - \text{[unclear]} \\ \text{[unclear]} &= \text{[unclear]} - \text{[unclear]} \\ \text{[unclear]} &= \text{[unclear]} - \text{[unclear]} \end{aligned}$$

$$y = \frac{1}{2} \left(\sqrt{1 + \frac{4}{x}} - \sqrt{1 - \frac{4}{x}} \right)$$

$$= \frac{1}{2} \left(\sqrt{1 + \frac{4}{x}} - \sqrt{1 - \frac{4}{x}} \right)$$

$$\frac{1}{x} = \frac{1}{x} \left(\sqrt{1 + \frac{4}{x}} - \sqrt{1 - \frac{4}{x}} \right)$$

$$\frac{1}{x} = \frac{1}{x} \left(\sqrt{1 + \frac{4}{x}} - \sqrt{1 - \frac{4}{x}} \right)$$

$$\frac{1}{x} = \frac{1}{x} \left(\sqrt{1 + \frac{4}{x}} - \sqrt{1 - \frac{4}{x}} \right)$$

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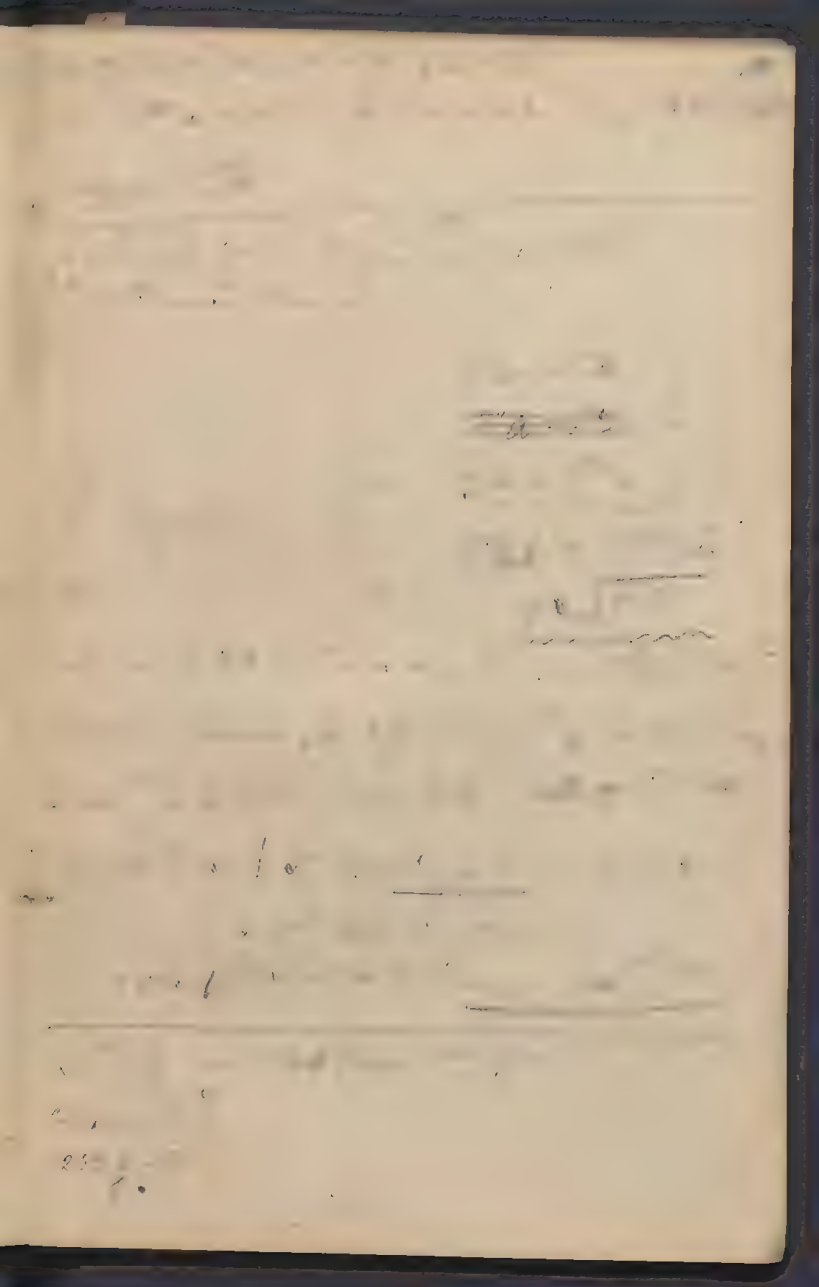
$$x =$$

$$-1 = \frac{2}{-4}$$

$$-\frac{1}{2} + \frac{1}{2}$$

1

$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$



1

199 100 100 100 100

100 100 100 100 100

100 100

$$100 = 100 + 100 + 100 + 100 + 100$$

$$u = 100 + 100 + 100 + 100 + 100$$

$$100 - 100 = 100 - 100$$

100 100 100 100 100

$$u = 100 - 100$$

$$100 = 100 + 100 + 100 + 100 + 100$$

$$u = 100 + 100 + 100 + 100 + 100$$

$$100 = 100 + 100 + 100 + 100 + 100$$

$$100 = 100 + 100 + 100 + 100 + 100$$

$$100 = 100 + 100 + 100 + 100 + 100$$

1881

Jan 1st

Feb 1st

Mar 1st

Apr 1st

May 1st

Jun 1st

Jul 1st

Aug 1st

Sep 1st

Oct 1st

Nov 1st

Dec 1st

1882

Jan 1st

Feb 1st

Mar 1st

Apr 1st

May 1st

Jun 1st

Jul 1st

Aug 1st

Sep 1st

Oct 1st

Nov 1st

Dec 1st

1883

Jan 1st

Feb 1st

Mar 1st

Apr 1st

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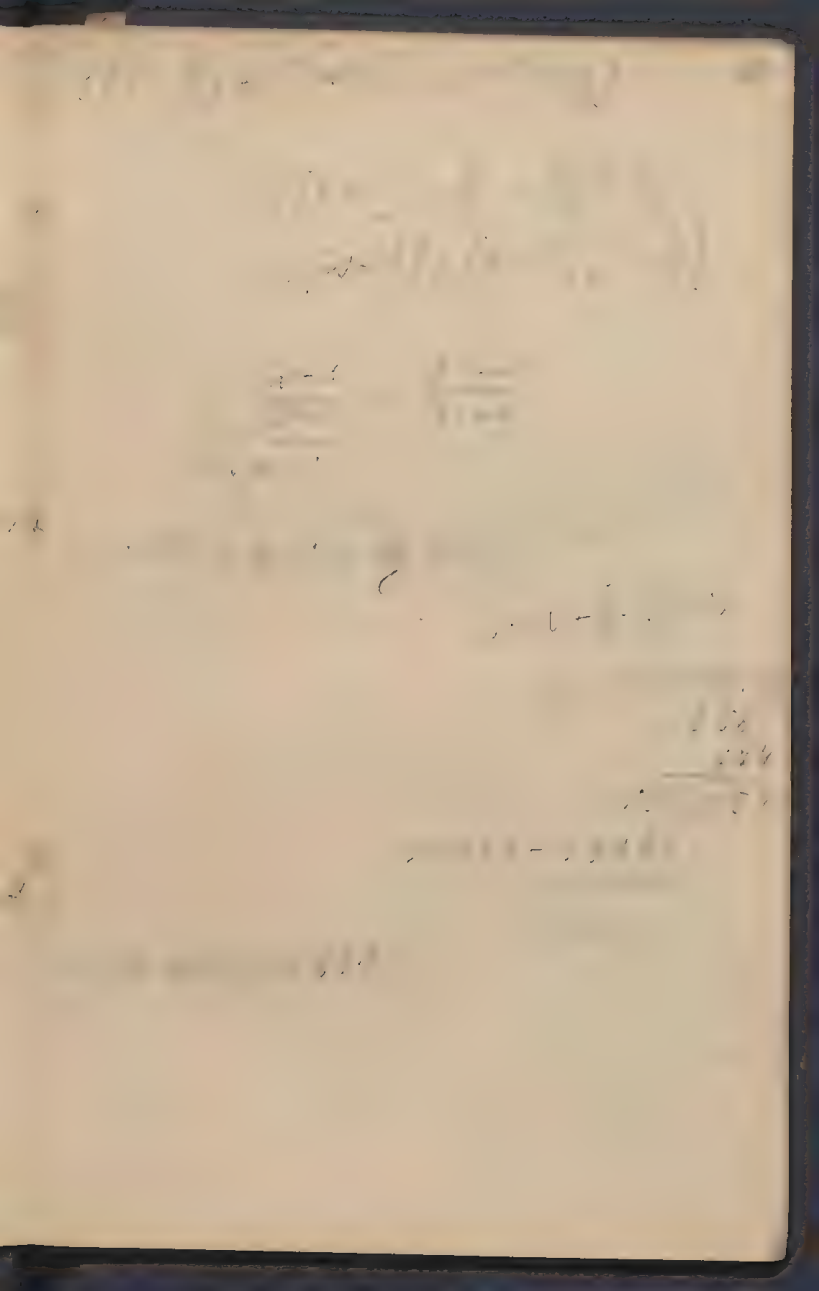
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$$E = \frac{1}{2}mv^2 + U(r) = A'' =$$



$$\dots A = \dots$$

$$\dots A = \dots$$

$$\dots A = \dots$$

$$\dots A = \dots$$

$$\dots A = \dots$$

$$\frac{S-A}{A} = \frac{A}{A}$$

$$= \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right)$$

$$= \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right)$$

$$= \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right)$$

$$= \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right)$$



$$- \frac{1}{2} = - \frac{1}{2}$$

$$u = \frac{1}{2} - \frac{1}{2}$$

$$= \frac{1}{2} + \frac{1}{2} = 1$$

$$= \frac{1}{2} - \frac{1}{2} = 0$$

$$= \frac{1}{2} - \frac{1}{2}$$

$$= \frac{1}{2} - \frac{1}{2}$$

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$$= \frac{1}{2} - \frac{1}{2}$$

$$= \frac{1}{2} - \frac{1}{2}$$

$$A = \frac{1}{1-x}$$

$$\frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots$$

$$= 1 + x$$

$$A = 1 + x$$

$$A = \frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots$$

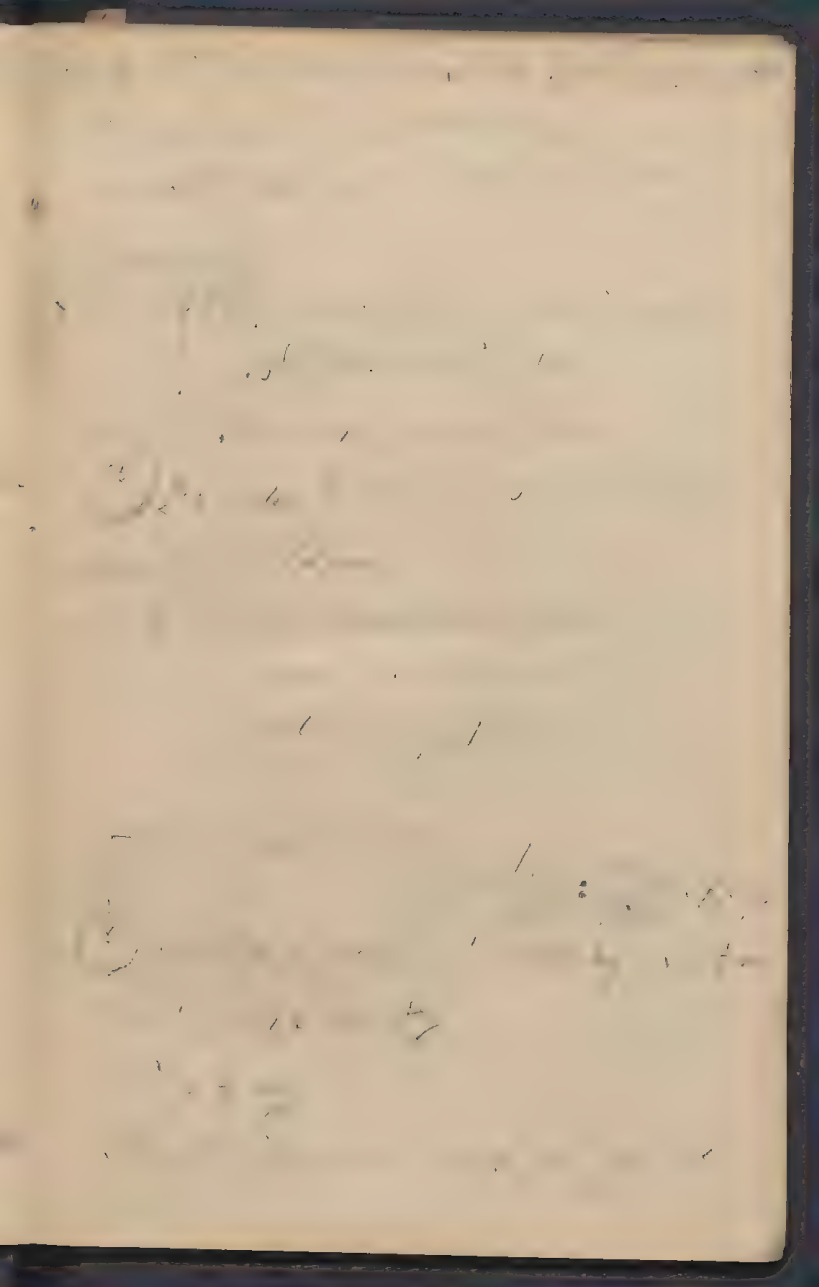
$$A = \frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots$$

$$= 1 + x$$

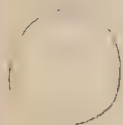
$$A = \frac{1}{1-x}$$

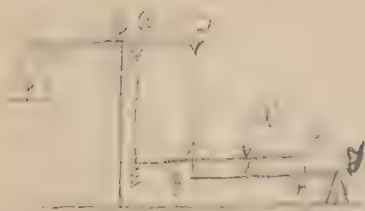
$$A = 1 + x$$

$$= \frac{1}{1-x}$$



4





$$\delta E = \frac{1}{E} F$$

$$\delta E = \frac{1}{E} F$$

$$F = \frac{\delta E}{\frac{1}{E}}$$

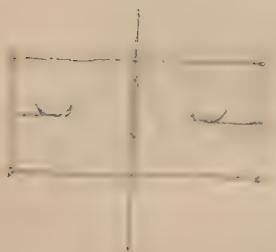
The first part of the proof is to show that
 if A and B are sets, then $A \cup B$ is a set.

Let $x \in A \cup B$. Then $x \in A$ or $x \in B$.
 If $x \in A$, then $x \in A$.
 If $x \in B$, then $x \in B$.

Therefore, $x \in A$ or $x \in B$.
 Hence, $A \cup B$ is a set.

The second part of the proof is to show that
 if A and B are sets, then $A \cap B$ is a set.

Let $x \in A \cap B$. Then $x \in A$ and $x \in B$.
 If $x \in A$, then $x \in A$.
 If $x \in B$, then $x \in B$.
 Therefore, $x \in A$ and $x \in B$.
 Hence, $A \cap B$ is a set.



1

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10

[Faint handwritten notes at the bottom of the page]

1890

10

5-

1875

10

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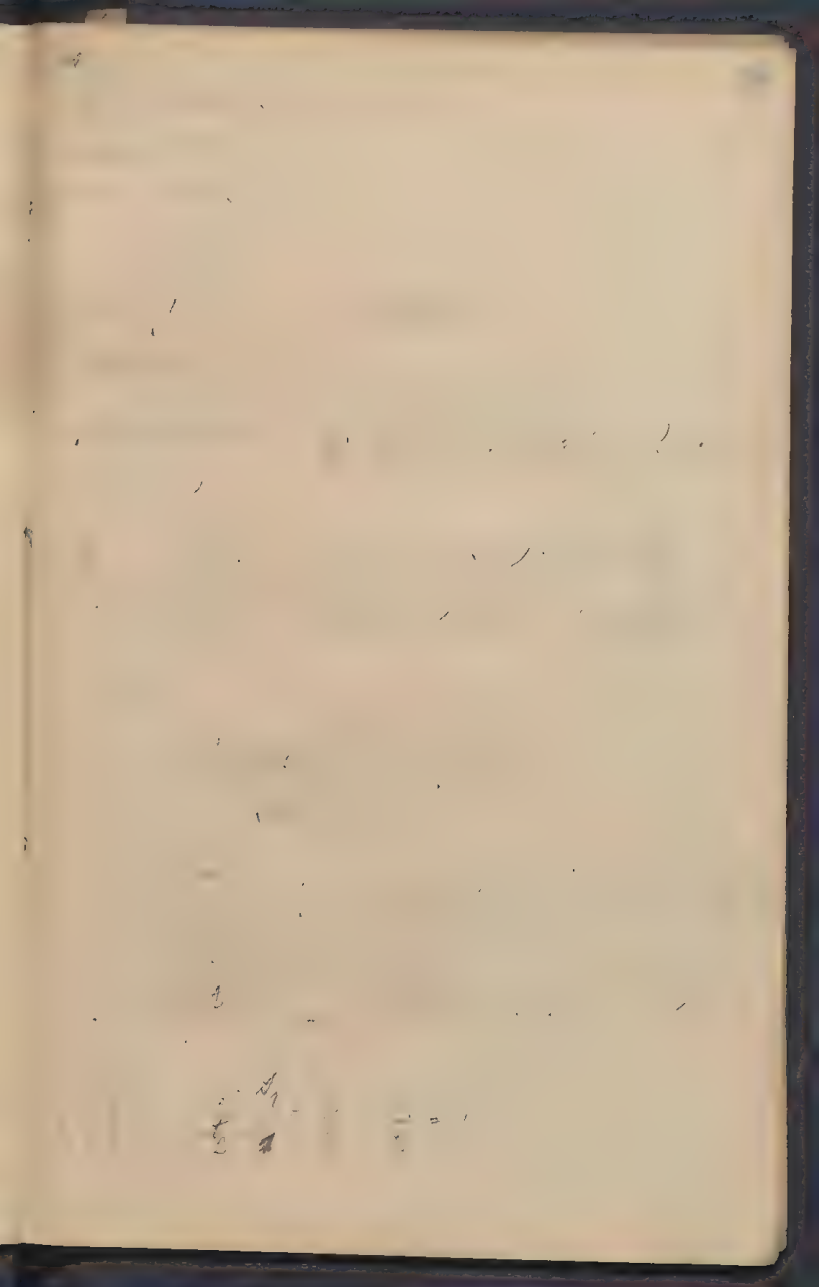
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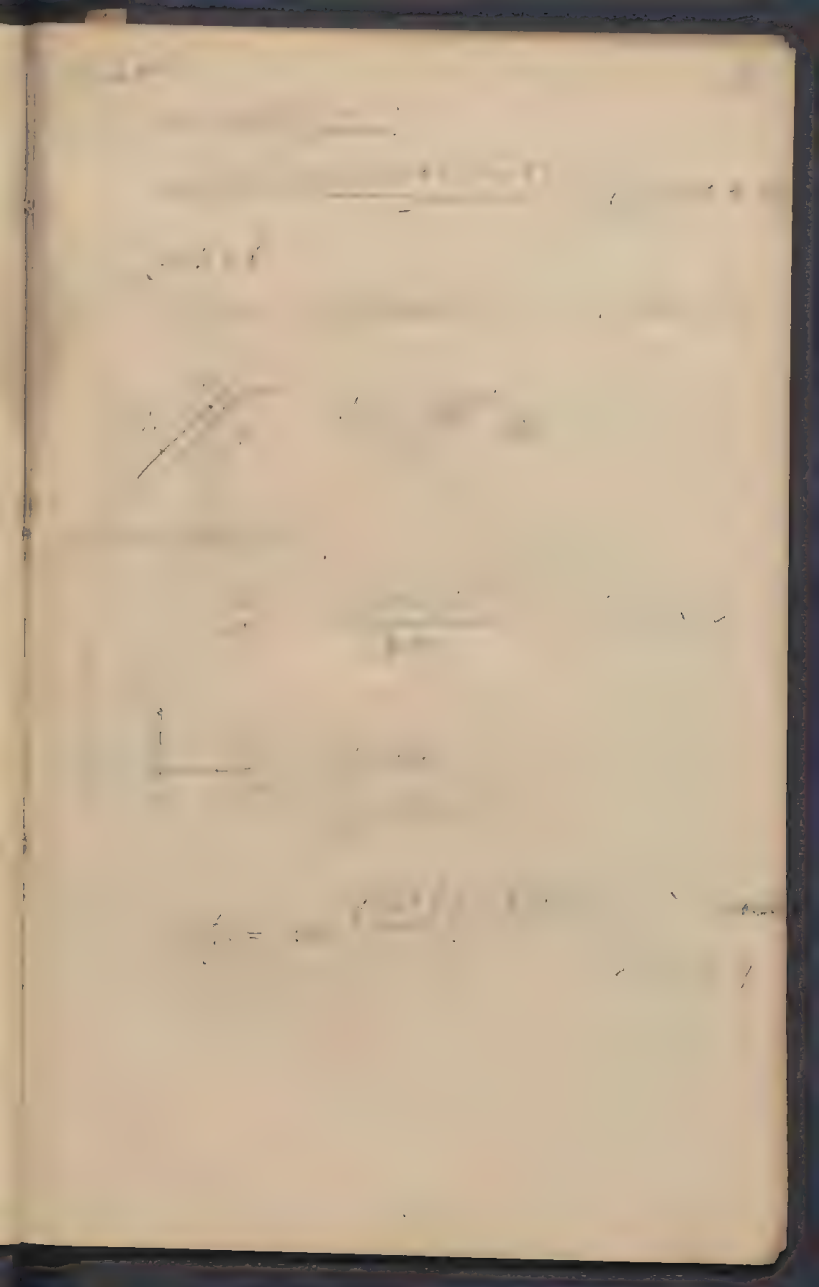
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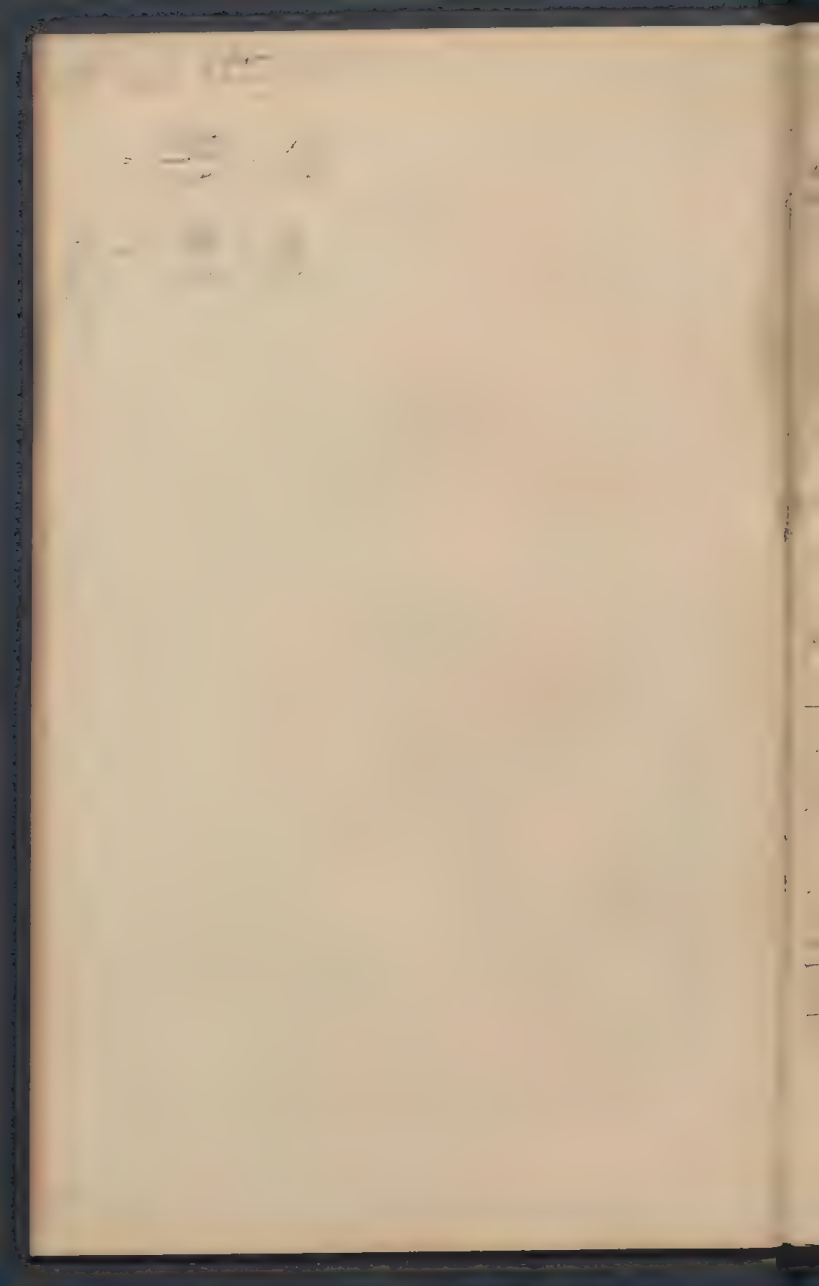
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$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

$$B = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$$

$$C = \begin{pmatrix} 3 & 4 \\ 4 & 3 \end{pmatrix}$$

$$D = \begin{pmatrix} 4 & 3 \\ 3 & 4 \end{pmatrix}$$

$$E = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$$

$$F = \begin{pmatrix} 6 & 5 \\ 8 & 7 \end{pmatrix}$$

$$G = \begin{pmatrix} 7 & 8 \\ 9 & 10 \end{pmatrix}$$

$$H = \begin{pmatrix} 8 & 7 \\ 10 & 9 \end{pmatrix}$$

$$I = \begin{pmatrix} 9 & 10 \\ 11 & 12 \end{pmatrix}$$

$$J = \begin{pmatrix} 10 & 9 \\ 12 & 11 \end{pmatrix}$$

$$K = \begin{pmatrix} 11 & 12 \\ 13 & 14 \end{pmatrix}$$

$$L = \begin{pmatrix} 12 & 11 \\ 14 & 13 \end{pmatrix}$$

$$M = \begin{pmatrix} 13 & 14 \\ 15 & 16 \end{pmatrix}$$

$$N = \begin{pmatrix} 14 & 13 \\ 16 & 15 \end{pmatrix}$$

$$O = \begin{pmatrix} 15 & 16 \\ 17 & 18 \end{pmatrix}$$

$$P = \begin{pmatrix} 16 & 15 \\ 18 & 17 \end{pmatrix}$$

$$Q = \begin{pmatrix} 17 & 18 \\ 19 & 20 \end{pmatrix}$$

$$R = \begin{pmatrix} 18 & 17 \\ 20 & 19 \end{pmatrix}$$

$$S = \begin{pmatrix} 19 & 20 \\ 21 & 22 \end{pmatrix}$$

$$T = \begin{pmatrix} 20 & 19 \\ 22 & 21 \end{pmatrix}$$

$$U = \begin{pmatrix} 21 & 22 \\ 23 & 24 \end{pmatrix}$$

$$V = \begin{pmatrix} 22 & 21 \\ 24 & 23 \end{pmatrix}$$

$$W = \begin{pmatrix} 23 & 24 \\ 25 & 26 \end{pmatrix}$$

$$X = \begin{pmatrix} 24 & 23 \\ 26 & 25 \end{pmatrix}$$

$$Y = \begin{pmatrix} 25 & 26 \\ 27 & 28 \end{pmatrix}$$

$$Z = \begin{pmatrix} 26 & 25 \\ 28 & 27 \end{pmatrix}$$

$$\frac{1}{100} = \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100}$$

$$= \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100}$$

$$= \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100}$$

$$= \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100}$$

$$= \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100}$$

$$N = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$$

$$= 10$$

$$N = 10$$

$$L = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

$$= 1$$

$$L = 1$$

$$L = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

$$= 1$$

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18

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$= \frac{1}{2} - \frac{1}{2}$$

1890

Jan 1

to Jan 2

to Jan 3

to Jan 4

to Jan 5

to Jan 6

to Jan 7

to Jan 8

to Jan 9

to Jan 10

to Jan 11

to Jan 12



20

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21/10/1911

Went to the

1. - 1/2 mile

2. - 1/2 mile

3. - 1/2 mile

4. - 1/2 mile

5. - 1/2 mile

6. - 1/2 mile

7. - 1/2 mile

8. - 1/2 mile

9. - 1/2 mile

10. - 1/2 mile

At 1000

At 1100

At 1200

At 1300

At 1400

At 1500

At 1600

At 1700

At 1800

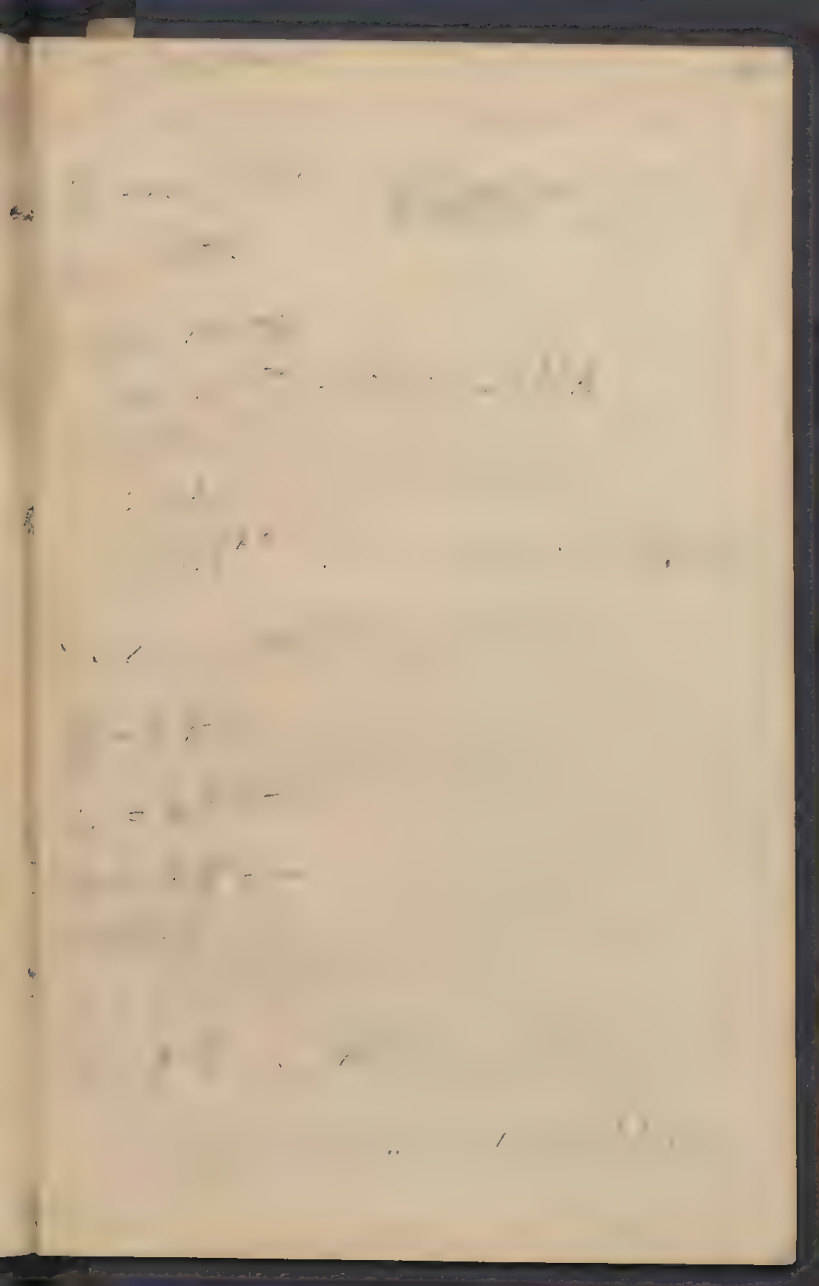
At 1900

At 2000

At 2100 + 6

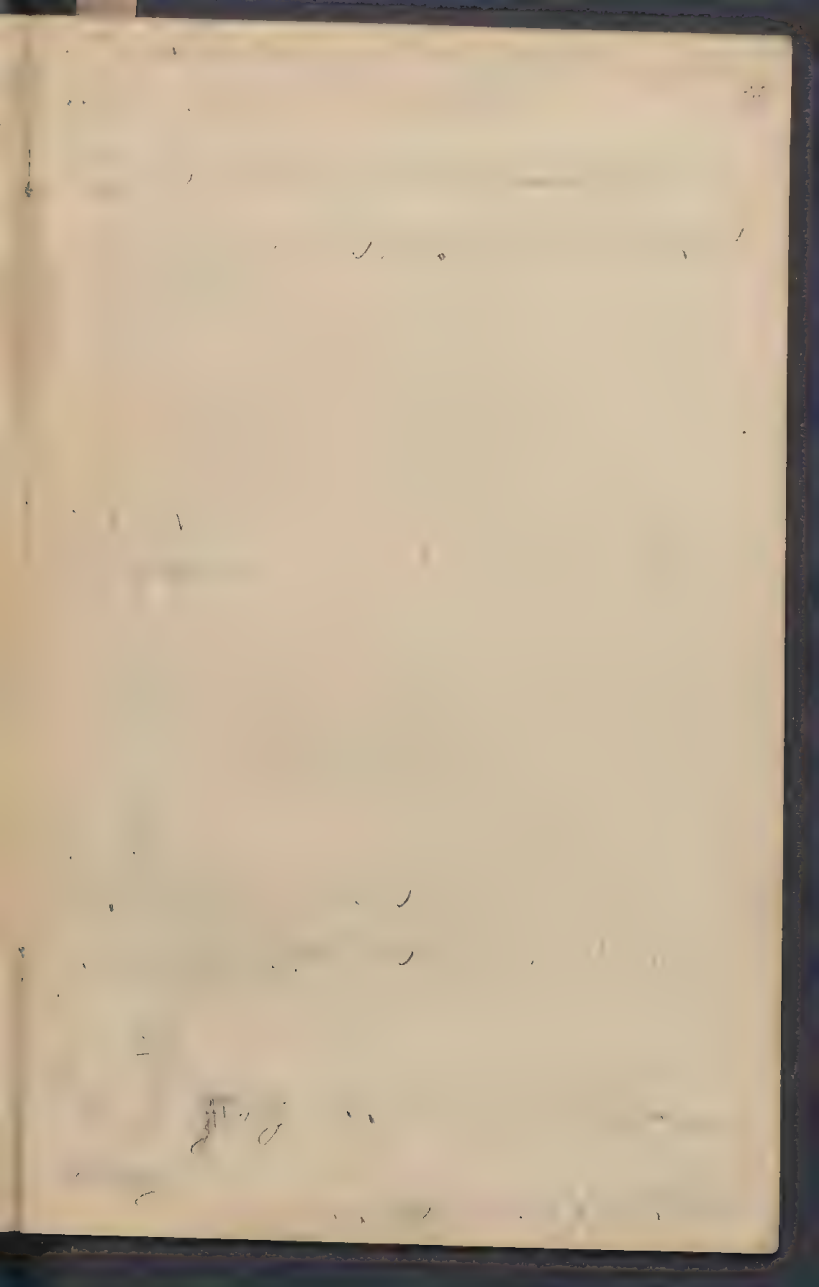
At 2200

At 2300





1



51
1700

1700
1700

1700
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1700

$$c - a$$

$$c - \frac{a}{2}$$

$$c - \frac{a}{2}$$

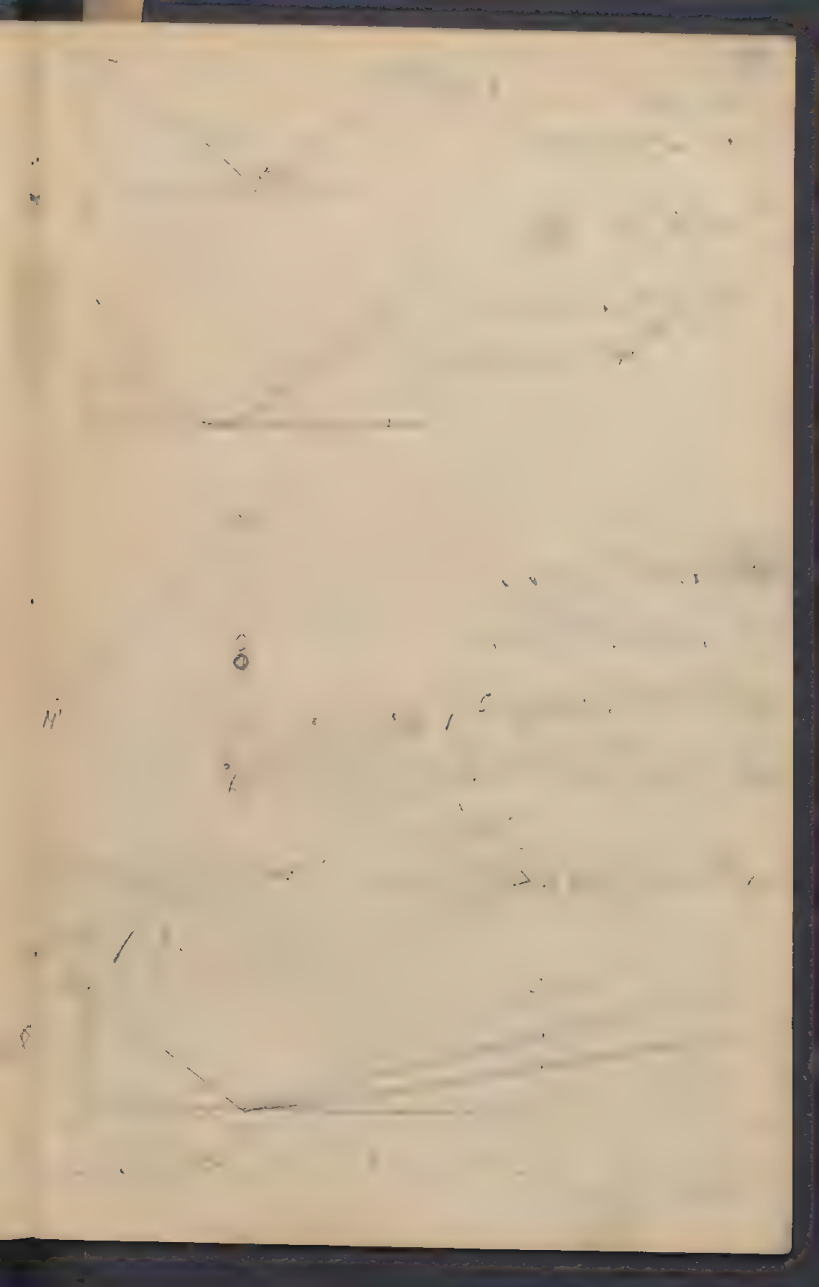
$$= \frac{a}{2} \left| \dots \right|$$

$$a - \dots$$

$$a - \dots$$

$$= \dots$$

$$a - \dots$$



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Handwritten marks, possibly a signature or initials.

Handwritten text, possibly a date or a short sentence, including a small 'd'.



$$f(x) = \int_0^x f(t) dt$$

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

$$f(x) = \frac{1}{x} \quad \text{for } x > 0$$

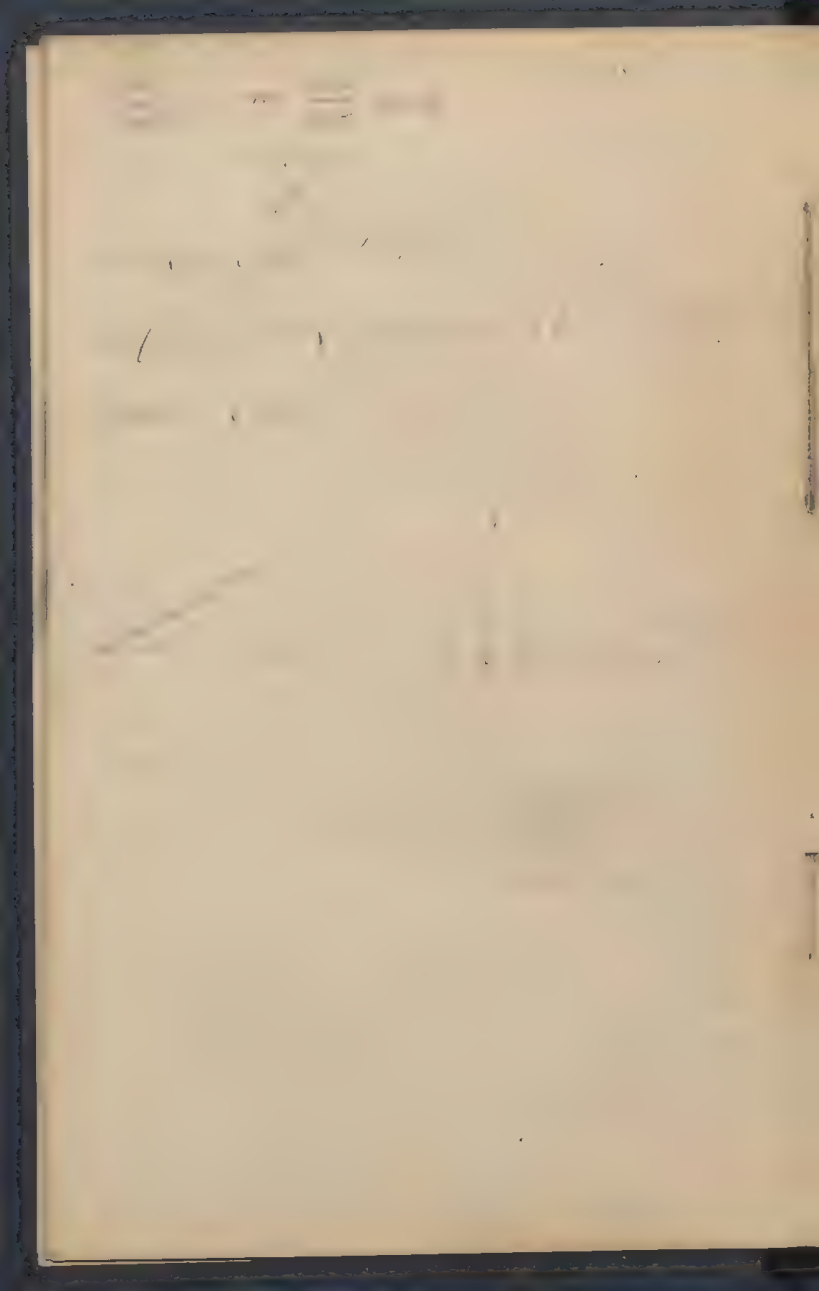


$$u = \frac{1}{x}$$



$$x = \frac{1}{2} \sqrt{a^2 + b^2}$$

... ..



$$= \frac{d\alpha}{dt} = 0$$

$$\frac{d\alpha}{dt} = 0$$

V 1



$$\frac{1}{x} = \frac{1}{x}$$

$$\frac{1}{x} = \frac{1}{x} - \frac{1}{x} + \frac{1}{x}$$

$$\frac{1}{x} = \frac{1}{x} - \frac{1}{x} + \frac{1}{x}$$

$$\frac{1}{x} = \frac{1}{x} - \frac{1}{x} + \frac{1}{x}$$

1/2

...
 ...
 ...
 ...
 ...

$$\begin{aligned}
 &= \frac{1}{T_1} \\
 &= \frac{1}{T_1}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{1}{T_1} \cdot T_1 = 1
 \end{aligned}$$

$$\dots = \frac{1}{T_1}$$

3

$$\frac{1}{x} = 2$$

$$= \frac{1}{x}$$

$$= \frac{1}{x} \frac{dx}{dt}$$

$$\frac{1}{x} = \frac{1}{x} \cdot \frac{1}{x}$$

$$\frac{1}{x} = \frac{1}{x}$$

$$\frac{1}{x}$$

$$f = \frac{1}{x}$$

$$= \frac{1}{2} \left(\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \frac{1}{x^5} + \frac{1}{x^6} + \frac{1}{x^7} + \frac{1}{x^8} + \frac{1}{x^9} + \frac{1}{x^{10}} \right)$$

$$= \frac{1}{2} \left(\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \frac{1}{x^5} + \frac{1}{x^6} + \frac{1}{x^7} + \frac{1}{x^8} + \frac{1}{x^9} + \frac{1}{x^{10}} \right)$$

$$f(x) = \frac{1}{2} \left(\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \frac{1}{x^5} + \frac{1}{x^6} + \frac{1}{x^7} + \frac{1}{x^8} + \frac{1}{x^9} + \frac{1}{x^{10}} \right)$$

$$\frac{1}{2} \left(\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \frac{1}{x^5} + \frac{1}{x^6} + \frac{1}{x^7} + \frac{1}{x^8} + \frac{1}{x^9} + \frac{1}{x^{10}} \right)$$

$$x \frac{1}{10} + \frac{1}{20} \frac{1}{10} - \frac{1}{20} - \frac{1}{20} = 0$$

$$x \frac{1}{10} - \frac{1}{20} = 0$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$\frac{1}{20} = x, \quad \frac{1}{20} = x$$

$$x^2 + 2x + 1 = 0$$

$$(x+1)^2 = 0$$

$$x+1 = 0$$

x

$$x = -1$$

$$x = -1$$

$$1 - \frac{1}{x^2} = 0$$

$$x^2 - 1 = 0$$

$$x^2 - 1 = (x-1)(x+1)$$

$$(x-1)(x+1) = 0$$

$$x-1 = 0$$

$$x = 1$$

2.1. 2011

$$\sqrt{1 + \frac{2i - 6i - i^2}{-1}} = 1 + \frac{2i - 6i}{-1} - \frac{1i}{-1}$$

$$\frac{1}{2} \frac{1}{-1} = \frac{1}{-2}$$

$$f(x) = \frac{1}{x^2}$$

$$f'(x) = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4}$$

$$f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{120}{x^6}$$

$$f^{(5)}(x) = -\frac{720}{x^7}$$

$$f^{(6)}(x) = \frac{5040}{x^8}$$

$$f^{(7)}(x) = -\frac{35280}{x^9}$$

$$f^{(8)}(x) = \frac{282240}{x^{10}}$$

$$f^{(9)}(x) = -\frac{2257920}{x^{11}}$$

$$f^{(10)}(x) = \frac{18063360}{x^{12}}$$

$$f(x) = \frac{1}{x^2} = x^{-2} \quad \Rightarrow \quad f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4}$$

$$f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{240}{x^6}$$

$$f^{(5)}(x) = -\frac{2880}{x^7}$$

$$f^{(6)}(x) = \frac{28800}{x^8}$$

$$f^{(7)}(x) = -\frac{230400}{x^9}$$

$$f^{(8)}(x) = \frac{2073600}{x^{10}}$$

$$f^{(9)}(x) = -\frac{20736000}{x^{11}}$$

$$f^{(10)}(x) = \frac{229376000}{x^{12}}$$

$$f^{(11)}(x) = -\frac{2752512000}{x^{13}}$$

Handwritten text at the top of the page, possibly a title or introductory notes.

$$f(x) = \frac{1}{x^2} = x^{-2} \quad | \quad f'(x) = -2x^{-3}$$

$$= -2x^{-3} = -\frac{2}{x^3}$$

$$f'(x) = -\frac{2}{x^3}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3} \quad \frac{d}{dx} x^{-2} = -2x^{-3}$$

$$f'(x) = -\frac{2}{x^3}$$

Handwritten text below the first derivative, possibly a note or a second line of the derivation.

Handwritten text below the second line, possibly a note or a third line of the derivation.

Handwritten text below the third line, possibly a note or a fourth line of the derivation.

Handwritten text below the fourth line, possibly a note or a fifth line of the derivation.

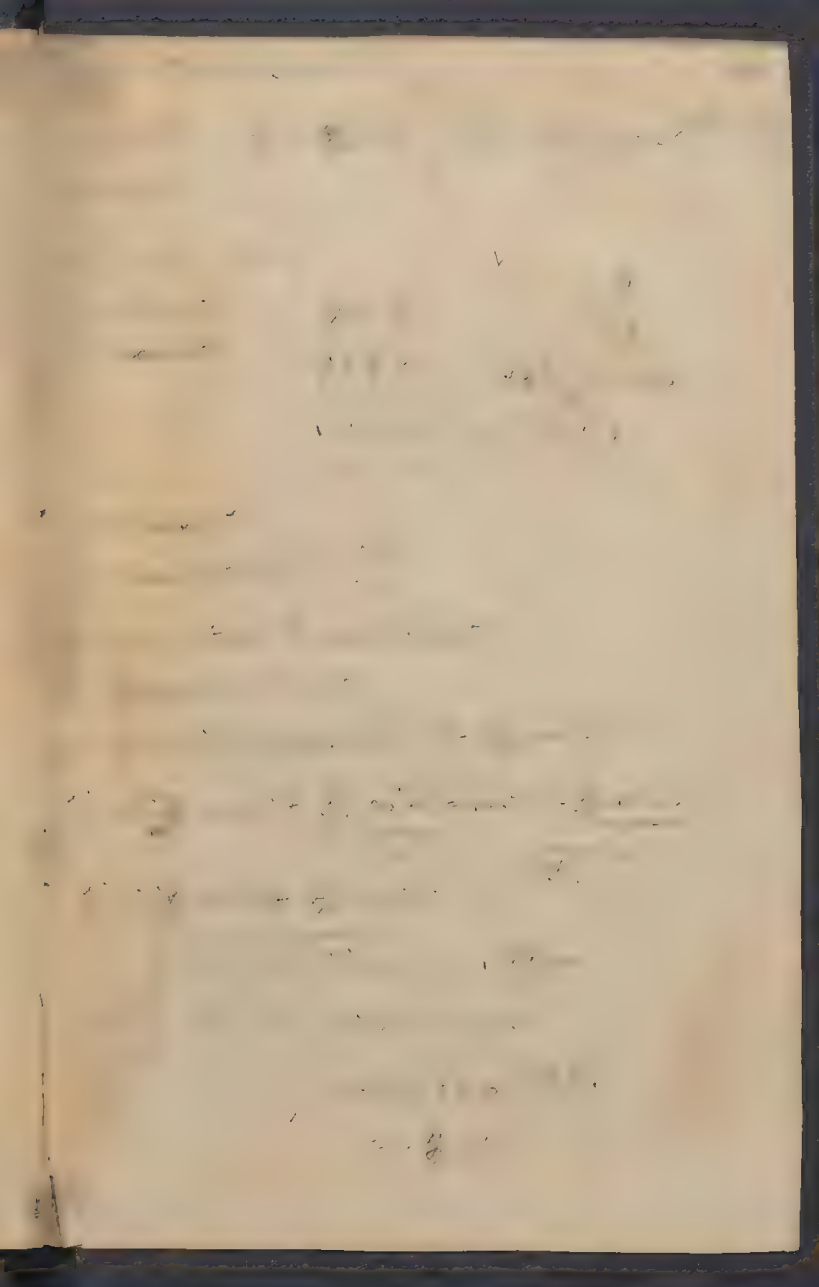
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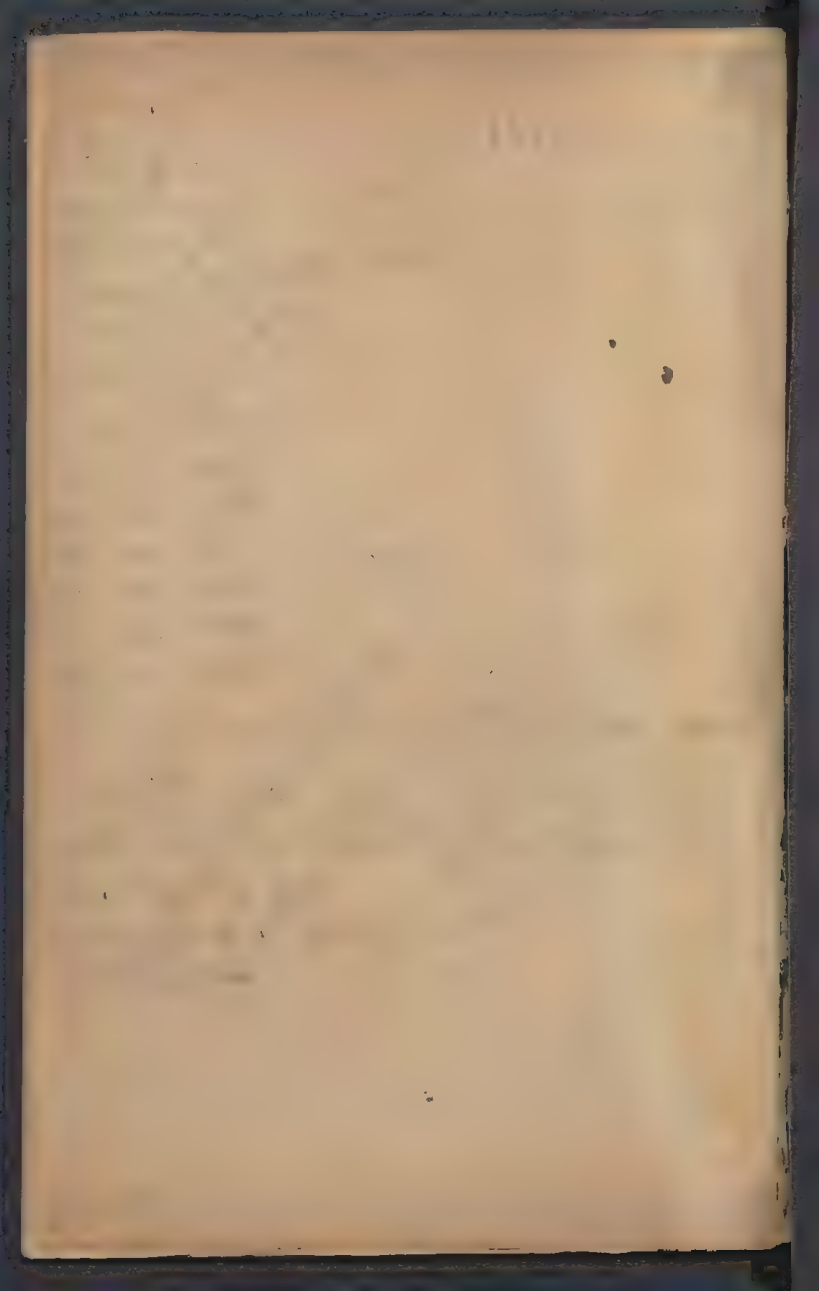
Handwritten text below the sixth line, possibly a note or a seventh line of the derivation.

Handwritten text below the seventh line, possibly a note or an eighth line of the derivation.

Handwritten text below the eighth line, possibly a note or a ninth line of the derivation.

Handwritten text at the bottom of the page, possibly a conclusion or a final note.





1875

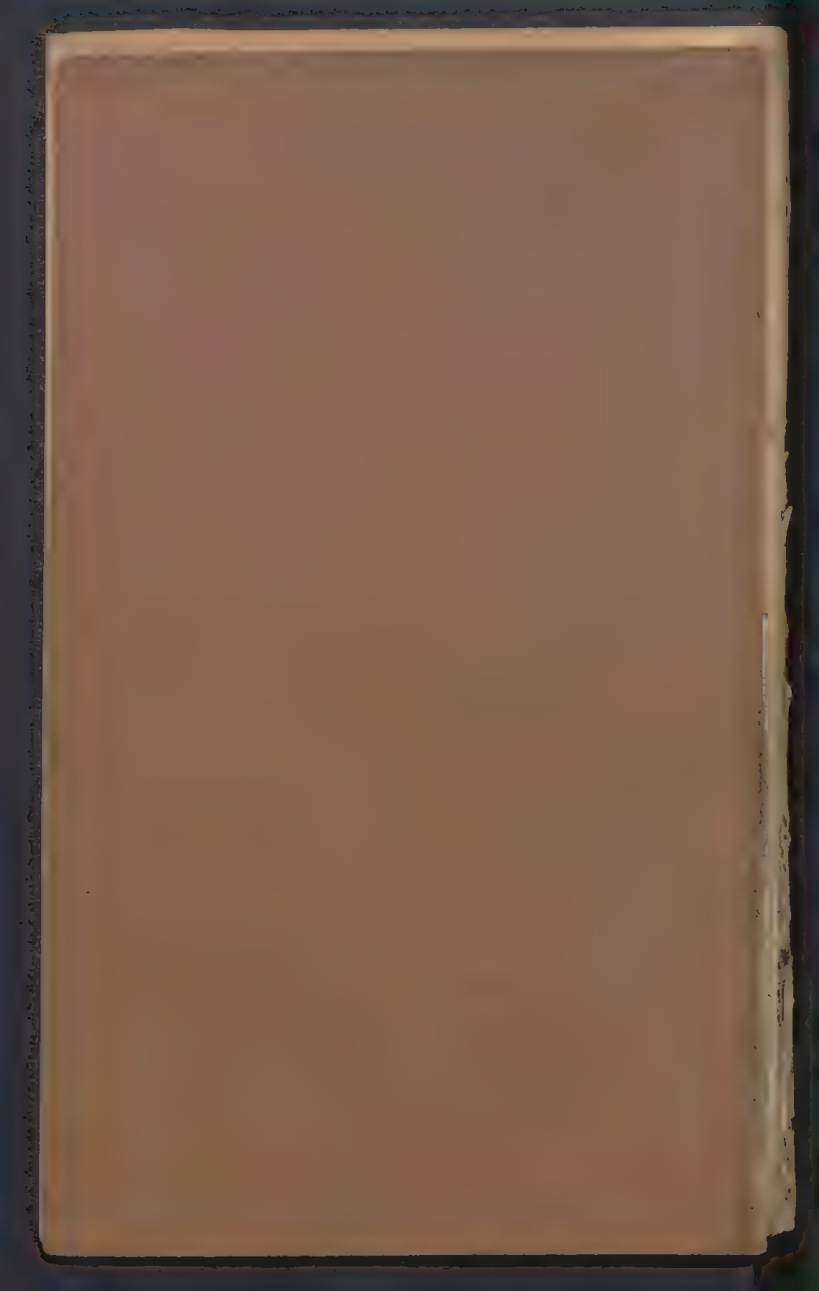
1875

1875

1875

1875

1875

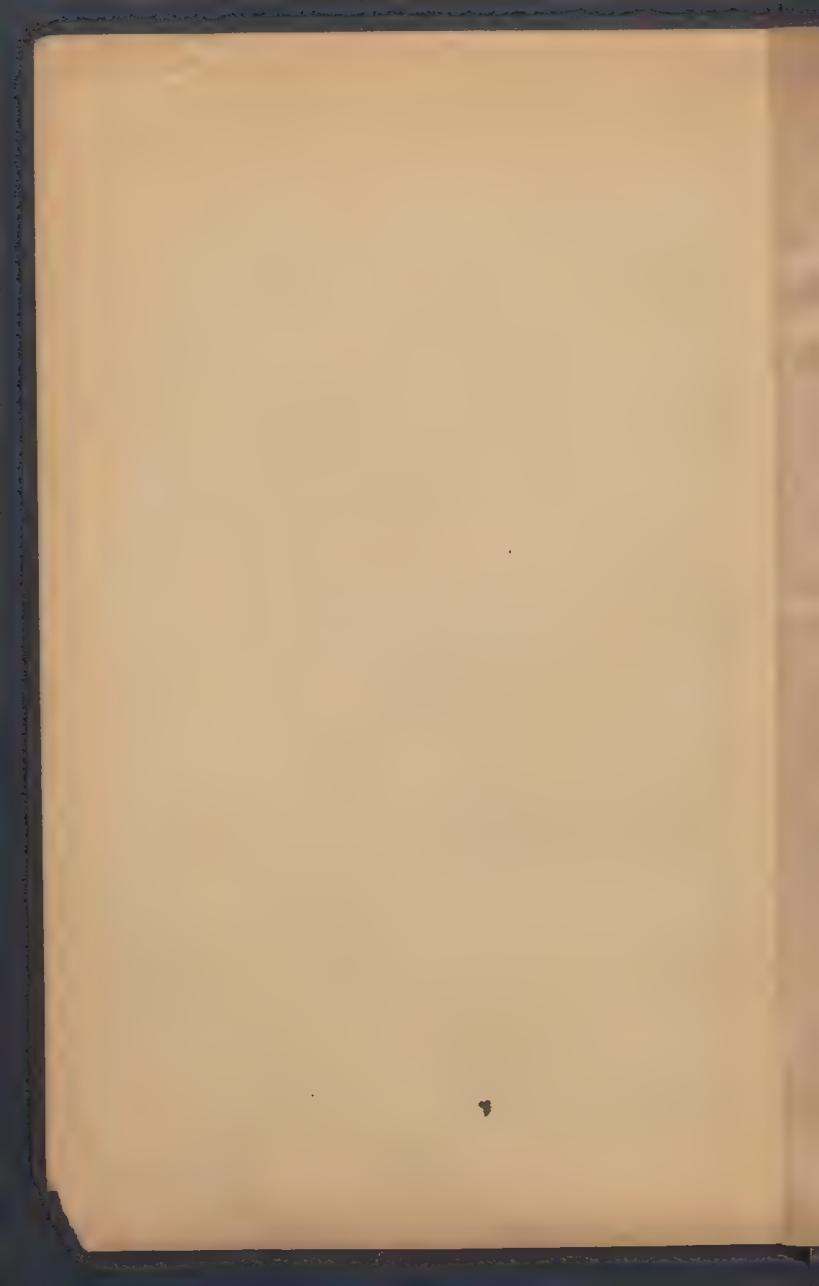


Dr. Josef Stefan

II.

Mechanik

I.S. 92/91. 2 Smoluchowski





1

1. 1000

... 1/2 - 1 - 1 - 1

1000

1000

1000

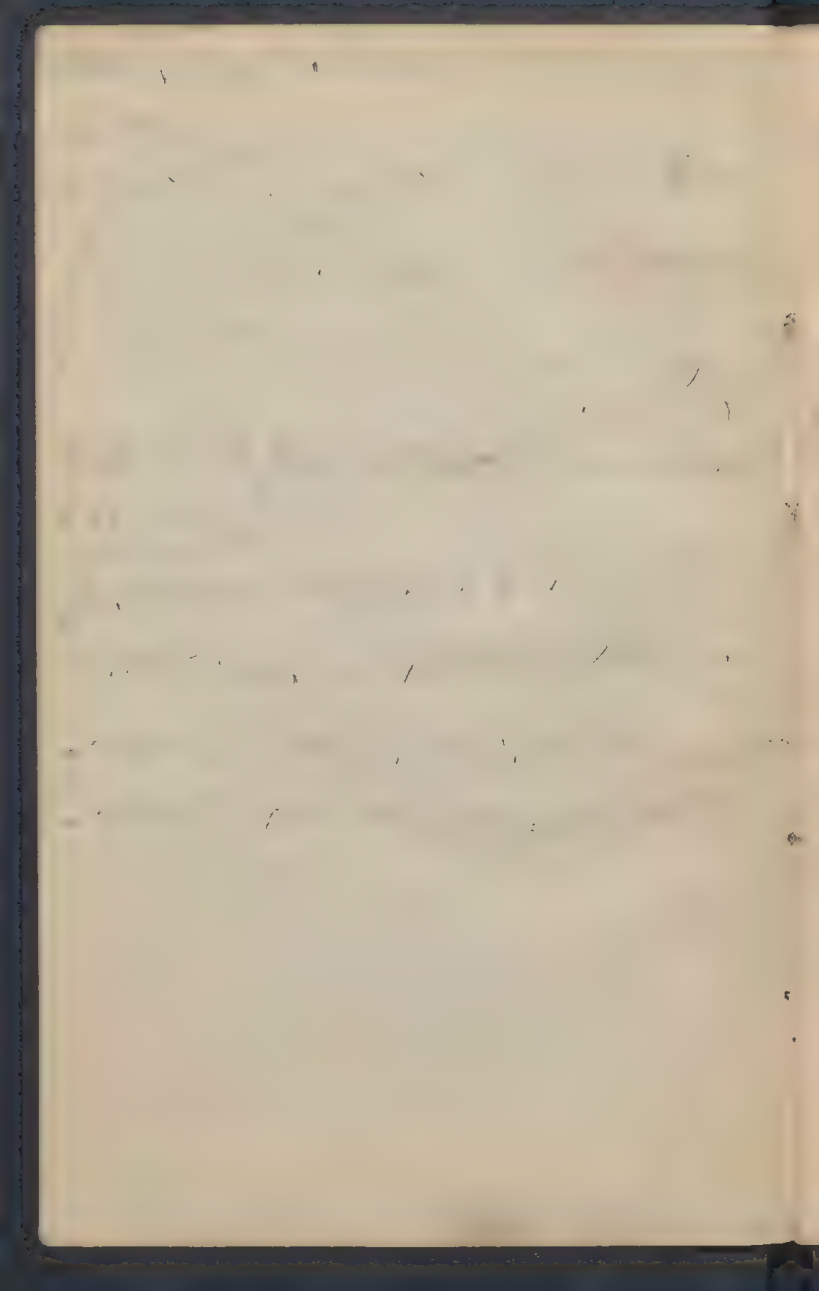
1000 1000 1000 1000 1000 1000 1000 1000 1000 1000

1000



F

1





1892

1

$$\frac{1}{\cos \theta} = \frac{1}{\sin \theta} = \dots =$$

1871-1872
1873-1874
1875-1876
1877-1878
1879-1880

1871

1872

[Faint, illegible handwriting throughout the page, possibly bleed-through from the reverse side.]

Int

$$\frac{1}{x^2}$$

$$\frac{1}{x^2}$$

$$\sin \theta = \frac{y}{r}$$

$$\frac{1}{x^2} = \frac{1}{r^2} \cdot \frac{r^2}{x^2}$$

$$x/7 = 3:22$$

1

1

$$1 \cdot 10^{-1}$$

$$1 \cdot 10^{-1}$$

$$1 \cdot 10^{-1}$$

$$1 \cdot 10^{-1}$$

$$\frac{d}{dx} = + \frac{1}{x^2} = \frac{1}{x^2} = \frac{1}{x^2}$$

$$= \frac{1}{x^2} = \frac{1}{x^2}$$

$$= \frac{1}{x^2} = \frac{1}{x^2}$$

$$\frac{d}{dx} = \frac{1}{x^2} = \frac{1}{x^2}$$

$$f = \frac{1}{x^2} = \frac{1}{x^2} = \frac{1}{x^2}$$

$$= \frac{1}{x^2} \left[\frac{1}{x^2} - \frac{1}{x^2} \right] = - \frac{2}{x^3}$$

$$= - \frac{2}{x^3} = - \frac{4}{x^3} = - \frac{4}{x^3}$$

h

p

h

1

h

h

h

$L = K$

x

$V = x''$

$x =$

$x + h'$

$x =$

P

x

x

x

1. $f(x) = x^2 + 1$

2. $f(x) + g(x) = x^2 + 1 + x^2 + 1 = 2x^2 + 2$

3. $f(x) - g(x) = x^2 + 1 - (x^2 + 1) = 0$

4. $f(x) \cdot g(x) = (x^2 + 1)(x^2 + 1) = x^4 + 2x^2 + 1$

5. $\frac{f(x)}{g(x)} = \frac{x^2 + 1}{x^2 + 1} = 1$

6. $f(g(x)) = (x^2 + 1)^2 = x^4 + 2x^2 + 1$

7. $g(f(x)) = (x^2 + 1)^2 = x^4 + 2x^2 + 1$

8. $f(f(x)) = (x^2 + 1)^2 = x^4 + 2x^2 + 1$

9. $g(g(x)) = (x^2 + 1)^2 = x^4 + 2x^2 + 1$

10. $f(g(f(x))) = ((x^2 + 1)^2)^2 = x^8 + 4x^4 + 1$

11. $g(f(g(x))) = ((x^2 + 1)^2)^2 = x^8 + 4x^4 + 1$

12. $f(f(g(x))) = ((x^2 + 1)^2)^2 = x^8 + 4x^4 + 1$

13. $g(g(f(x))) = ((x^2 + 1)^2)^2 = x^8 + 4x^4 + 1$

14. $f(g(g(x))) = ((x^2 + 1)^2)^2 = x^8 + 4x^4 + 1$

8 —————
————— →

X =

$$\frac{1}{1} = 1 + 0$$

$$11 = 1 + 10$$

1877

- 11

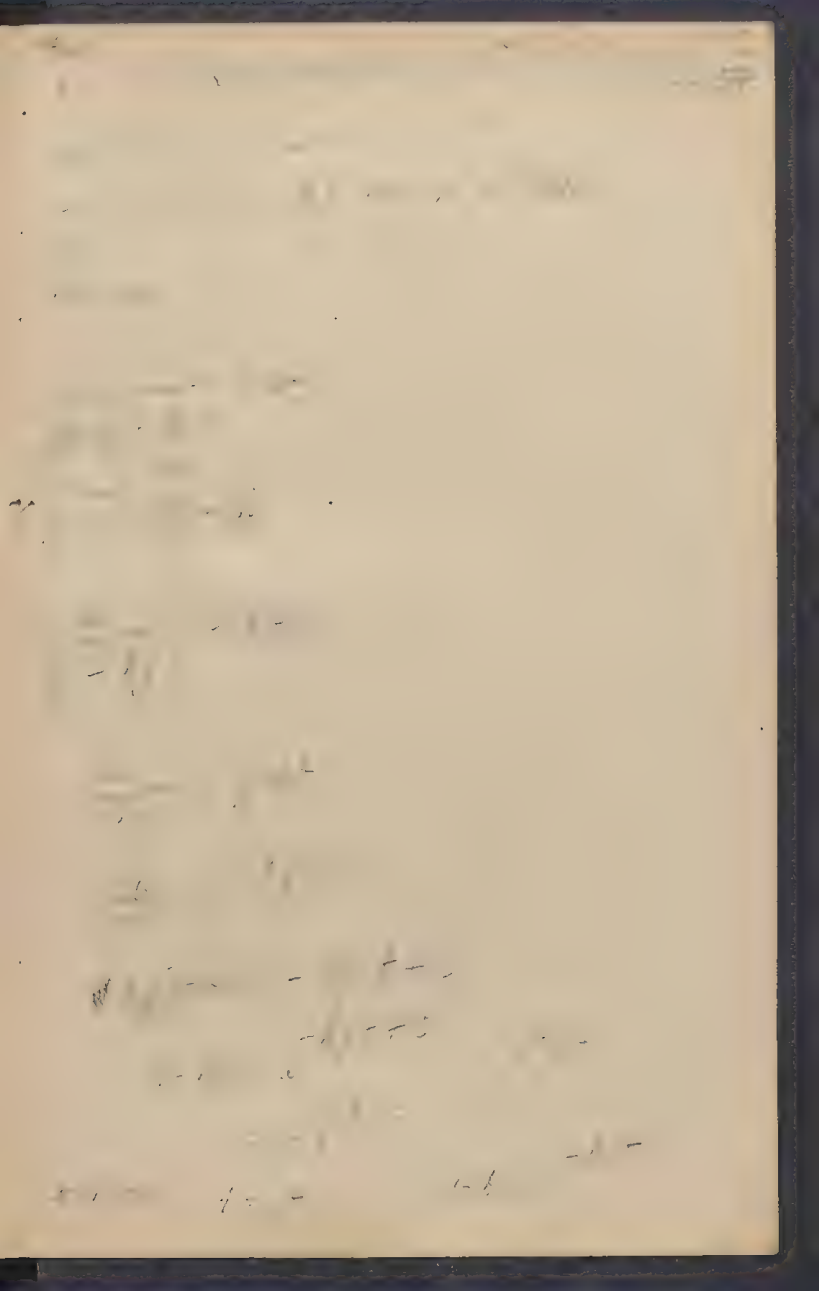
1877-1878

1878-1879

1879-1880

1880-1881

1881-1882 = 14



$$= 4 - \frac{1}{2} - \frac{1}{2} + \frac{1}{2} - \frac{1}{2}$$

$$= 4 - \frac{1}{2} - \frac{1}{2}$$

$$= 4 - \frac{1}{2}$$

$$= 4$$

$$14 = \frac{14}{x} - \frac{14 \cdot \frac{1}{x}}{b}$$

$$x = \frac{1}{b} + \frac{1}{x} - 1$$

$$1 = \frac{1}{x} - 1$$

$$1 = \frac{1}{x} - \frac{1}{x} - 1 - 1$$

$$1 = \frac{1}{x} - \frac{1}{x} - 1 - 1 - 1$$

$$x = \frac{1}{b} - \frac{1}{x} + \frac{1}{x} - \frac{1}{x}$$

$$x = \frac{1}{b} - \frac{1}{x}$$

11

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$x^2 - 4x + 4 = (x-2)^2$$

$$= \frac{-1}{0+1} \cdot \frac{1}{n}$$

$$= \frac{-1}{-1} \cdot \frac{1}{n}$$

$$= \frac{1}{1+0} \cdot \frac{1}{n}$$

$$dx = \frac{1}{x^2} \cdot \frac{1}{n} \quad -D$$

$$x^2 - 2x + 1 = (x-1)^2$$

$$\frac{x^2 - 2x + 1}{2}$$

$$A = 0$$

$$-\frac{1}{2} \log \frac{1+x}{1-x}$$

$$\frac{1312f^2}{2}$$

$$= \frac{1}{2}$$

$$\frac{x}{y}$$

$$\frac{1}{x} = \alpha$$

$$x = \frac{1}{\alpha}$$

$$y = -\frac{1}{2}t^2 - \frac{1}{2}t$$

$$x = -\frac{1}{2}t^2 - \frac{1}{2}t$$

$$x = \frac{1}{2}$$

$$x = \frac{1}{2}t^2 - \frac{1}{2}t$$

1-11-11

1-11-11

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1-11-11

$$1-11-11 = \frac{1-11-11}{1} = \frac{1-11-11}{1} = \frac{1-11-11}{1}$$

1-11-11

E.

W. - - -

- - - - -

- - - - -

- - - - -

$$= \frac{1}{10}$$

$$= \frac{1}{10}$$

$$= \frac{1}{10}$$

$$= \frac{1}{10} - \frac{1}{10} = \frac{1}{10}$$

I ...

$$= \frac{1}{10} - \frac{1}{10} = \frac{1}{10}$$

$$= \frac{1}{10} - \frac{1}{10} = \frac{1}{10}$$

$$= \frac{1}{10} - \frac{1}{10} = \frac{1}{10}$$

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$$x = \frac{1}{2} \left(1 + \sqrt{5} \right)$$

$$\frac{1}{2} \left(1 + \sqrt{5} \right)$$

$$\frac{1}{2} \left(1 + \sqrt{5} \right)$$

$$\frac{1}{2} \left(1 + \sqrt{5} \right)$$

$$\frac{1}{2} \left(1 + \sqrt{5} \right)$$

g - - - - -

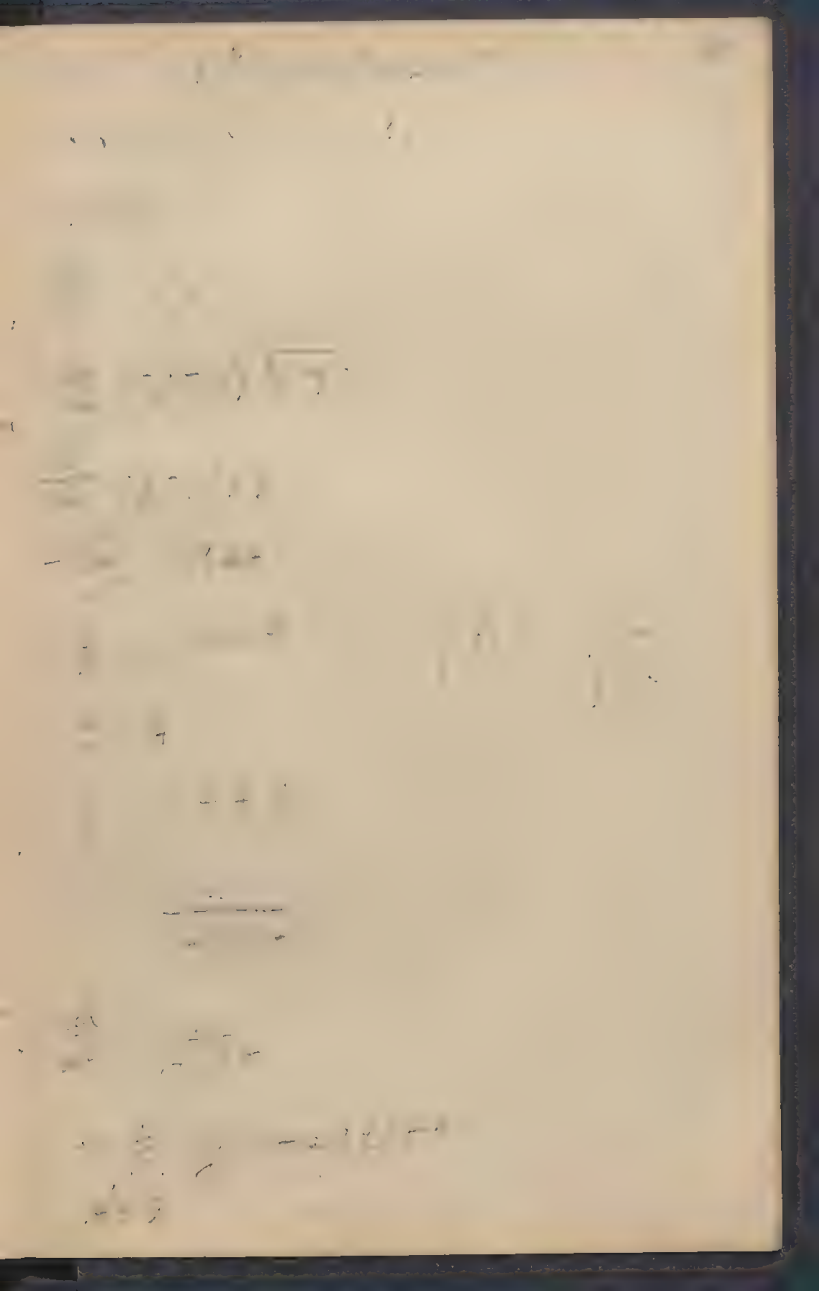
- - -

- - - - -

- - - - - +

/

- - - x



$$T = \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$T = \frac{1}{1 - \frac{v^2}{c^2}} + \frac{1}{1 - \frac{v^2}{c^2}}$$

$$A = \frac{1}{\sqrt{1-\beta^2}} \cdot \frac{1}{\sqrt{1-\beta^2}} = \frac{1}{1-\beta^2}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{1-\frac{v^2}{c^2}} = \frac{1}{1-\beta^2}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}} = \frac{1}{1-\beta^2}$$

$$A = \frac{1}{1-\beta^2}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{1-\beta^2} = \frac{1}{1-\frac{v^2}{c^2}}$$

$$A = \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

$$= \frac{1}{2} (1 + \frac{1}{2} + \frac{1}{4} + \dots)$$

Page

1. 1. 1. 1.

2. 2. 2. 2.

3. 3. 3. 3.

4. 4. 4. 4.

5. 5. 5. 5.

6. 6. 6. 6.

7. 7. 7. 7.

1

2

$$= \frac{\alpha}{\beta}$$

$$= \frac{1}{2} - \frac{1}{2}$$

$$x + y^2 = \frac{1}{2} + \frac{1}{2}$$

$$11^2 = 121$$

$$11^2 = 121$$

$$11^2 = 121$$

$$11^2 = 121$$

1. $\frac{1}{x^2} = x^{-2}$

$$\frac{d}{dx} x^{-2}$$

$$= -2x^{-3}$$

$$= -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2}$$

$$= -\frac{2}{x^3}$$

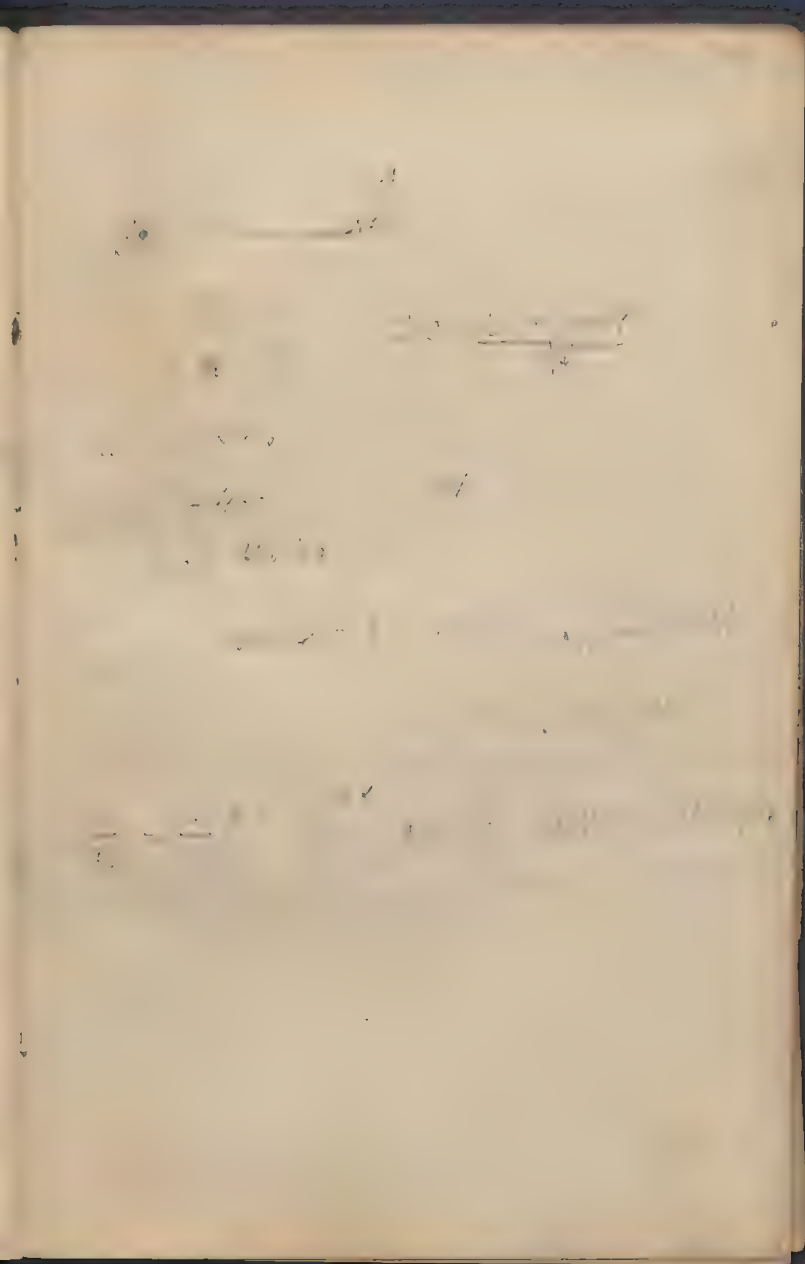
$$\frac{d}{dx} x^{-2}$$

$$= -2x^{-3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$



1. $\frac{1}{x^2} = x^{-2}$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

$$x = \frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

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$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\frac{1}{1 - \frac{v^2}{c^2}}$$

$$\gamma = \sqrt{1 + \frac{v^2}{c^2}} \quad \frac{2cy}{a^2} = \sqrt{1 + \frac{8cy^2}{a^2}}$$

1872
Jan 1
Feb 1
Mar 1

1873

Apr 1
May 1
Jun 1

Jul 1
Aug 1
Sep 1

Oct 1
Nov 1
Dec 1

1874
Jan 1
Feb 1

Mar 1
Apr 1
May 1

Jun 1
Jul 1
Aug 1

>

1 2

$$\frac{d}{a}$$

$$x^2 - x^2$$

$$y = \frac{1}{x}$$

1

$$f: a, z$$

$$c = \frac{1}{x}$$

$$x = \frac{1}{y} \quad \frac{1}{x^2} = \frac{1}{y^2}$$

for the

$$f = \frac{1}{x} \quad \frac{1}{x^2} = \frac{1}{y^2}$$

1

10

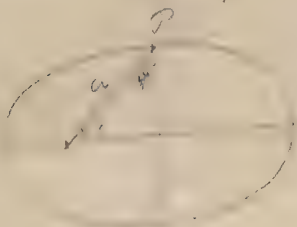
$$1.35 \times 10^{-10} \text{ sec}$$

$$\frac{\Delta J}{J} = 0.001 \frac{\Delta \omega}{\omega}$$

1.35 x 10^-10 sec

$$H_0 = 1 - r_0$$

$$r = 1 - \gamma$$



(15)



$$T_c \quad L, V = V$$

$$K = 1/2$$

V

$$m, \quad \dots$$

$$L = \dots$$

$$m, \quad \dots$$

$$L = \dots$$

$$L = \dots$$

$$L = \dots$$

$$m = \dots$$

$$\frac{d}{dt} m = \dots$$

$$L = \dots$$

Jan 1881

1881

1881

1881

1881

1881

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1881

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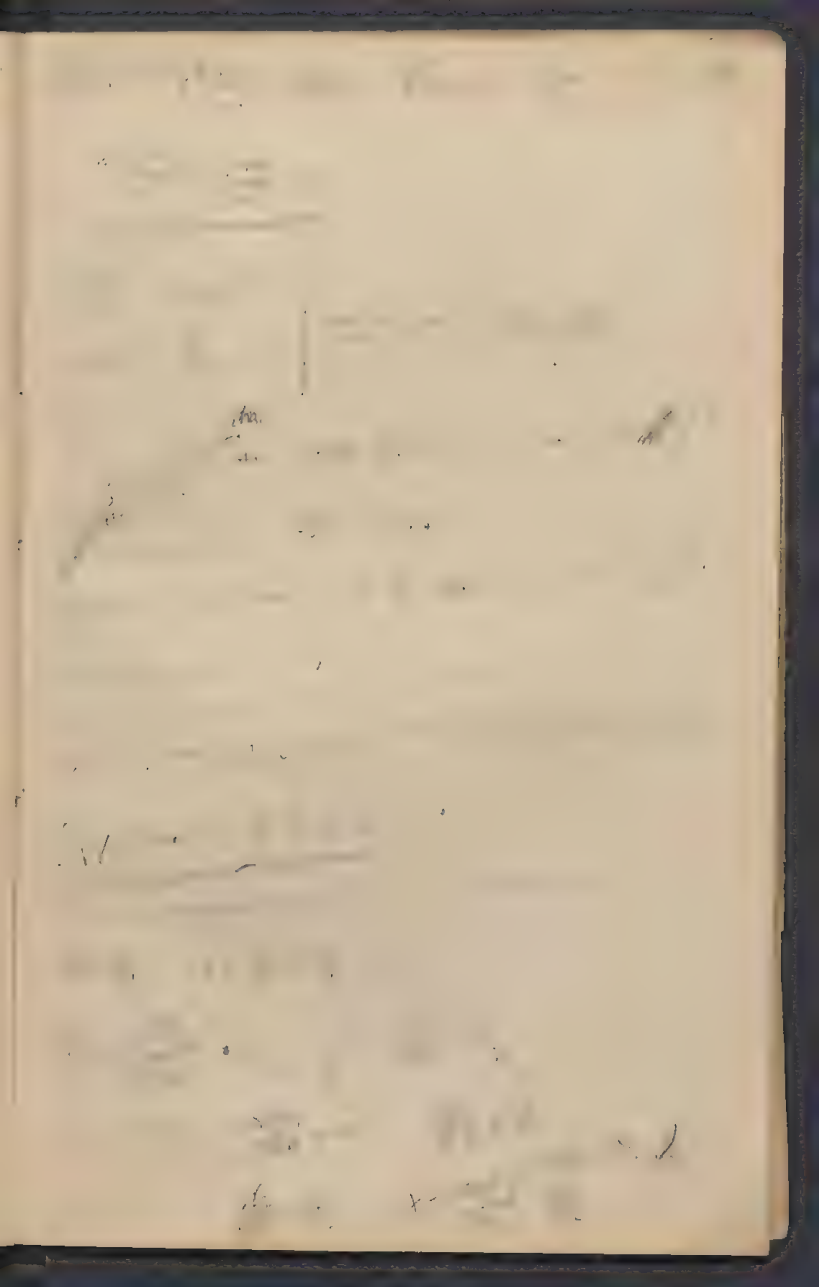
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125 11 2

11 2

100 - 1

7

10

+

100

$\lambda = \frac{1}{100}$

100

$\lambda = \frac{1}{100}$

$= \frac{1}{100}$

100

11

X

Y

ve

11 - 11 = 0

m - 2

1. 1

2. 2

3. 3

4. 4

5. 5

6. 6

7. 7

8. 8

$$T_1 = T_2 = \sqrt{1 + \dots}$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots = \frac{1}{2} = \frac{1}{2}$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots$$

$$T_1 = T_2 = \dots$$



x

$$FA' = 2^2$$

$$R \quad n^2 - n - 2n^2 \quad . . .$$

$\frac{1}{2}$
 $\frac{1}{3}$
 $\frac{1}{4}$

| | | | |
|---|--|---------------|---------------|
| 2 | | | |
| 1 | | $\frac{1}{2}$ | $\frac{1}{3}$ |
| | | $\frac{1}{3}$ | $\frac{1}{4}$ |
| | | $\frac{1}{4}$ | $\frac{1}{5}$ |

TABLE

$\lambda = 1 - A$
 $\gamma = 1 - B$
 $\pi = 1 - C$

1840

21/10/40

1840

1840

1840

1840

1840

1840

1840

1840

1840

1840

X

IX

(

+ 1

2

$\theta = 0, \dots$

$$\frac{1}{\sqrt{1-\beta^2}} \frac{m}{\gamma^2}$$

$\frac{1}{\sqrt{1-\beta^2}}$
M



$$\sin \theta = \frac{1}{\gamma} \frac{v}{c}$$

can

2. 1.

$$\frac{1}{\sqrt{1-\beta^2}} = \gamma$$

$$\frac{1}{\sqrt{1-\beta^2}} = \gamma$$

$$\frac{1}{\sqrt{1-\beta^2}} = \gamma$$

$$\frac{1}{\sqrt{1-\beta^2}} = \gamma$$

$$\frac{1}{\sqrt{1-\beta^2}} = \gamma$$

$$1 - \frac{1}{2} = \frac{1}{2}$$

$$1 - \frac{1}{4} = \frac{3}{4}$$

$$1 - \frac{1}{8} = \frac{7}{8}$$

$$1 - \frac{1}{16} = \frac{15}{16}$$

$$1 - \frac{1}{32} = \frac{31}{32}$$

$$1 - \frac{1}{64} = \frac{63}{64}$$

$$1 - \frac{1}{128} = \frac{127}{128}$$

$$1 - \frac{1}{256} = \frac{255}{256}$$

$$1 - \frac{1}{512} = \frac{511}{512}$$

$$1 - \frac{1}{1024} = \frac{1023}{1024}$$

$$1 - \frac{1}{2048} = \frac{2047}{2048}$$

1 / 1

11

2.1.13

X 42

$$\frac{1}{x^2} = x^{-2}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$\frac{d^2 x}{dt^2} = - \frac{1}{m} \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$m \frac{d^2 x}{dt^2} = - \frac{dU}{dx}$$

$$\frac{d^2 x}{dt^2} = - \frac{1}{m} \frac{dU}{dx}$$

$$\frac{d^2 x}{dt^2} = - \frac{1}{m} \frac{dU}{dx}$$

$$\frac{d^2 x}{dt^2} = - \frac{1}{m} \frac{dU}{dx}$$

12th - 18th

18

1

18th - 19th

19th

19th - 20th

20th - 21st

21st - 22nd

22nd - 23rd

23rd - 24th

24th - 25th

25th - 26th

26th - 27th

$$A_1 = \frac{1}{2} \frac{d^2 \phi}{dx^2} = \frac{1}{2} \frac{d^2}{dx^2} \left(\frac{1}{2} x^2 \right) = \frac{1}{2} \cdot 1 = \frac{1}{2}$$

$$N \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2} =$$

$$m \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2} =$$

$$\frac{N \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2}}{m \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2}} =$$

$$\frac{N}{m} =$$

$$N \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2} + m \cdot \frac{1}{2} \frac{d^2 \phi}{dx^2} = 0$$

$$N \cdot \frac{d^2 \phi}{dx^2} + m \cdot \frac{d^2 \phi}{dx^2} = A$$

$$\frac{d^2 \phi}{dx^2} (N + m) = A$$

$$F_z = m \cdot a_z = 0$$

$$F_y = m \cdot a_y = B + \dots$$

$$F_x = m \cdot a_x = \dots$$

$$F_z = m \cdot a_z = \dots$$

$$\frac{F_z - m \cdot a_z}{\dots}$$

$$\frac{F_y + m \cdot a_y}{\dots}$$

$$\frac{F_x - m \cdot a_x}{\dots}$$

$$\frac{F_z}{\dots}$$

$$\frac{F_y}{\dots}$$

$$\frac{F_x}{\dots}$$

$$\frac{F_z}{\dots}$$

$$\frac{F_y}{\dots}$$

$$\frac{F_x}{\dots}$$

1. ...
 2. ...
 3. ...
 4. ...
 5. ...
 6. ...
 7. ...
 8. ...
 9. ...
 10. ...

11. ...
 12. ...

$$\begin{aligned}
 M &= \frac{1}{2} - \frac{1}{2} \frac{1}{2} = \frac{1}{4} \frac{M}{2} \left(\frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) \\
 m &= \frac{1}{2} - \frac{1}{2} \frac{1}{2} = -\frac{1}{4} \frac{M}{2} \left(\frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right)
 \end{aligned}$$

$$1.2 - 1.5 - 2 \cdot 2 = 0$$

$$1.2 - 1.5 - 2 \cdot 2 = 0$$

$$1.2 - 1.5 - 2 \cdot 2 = 0$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

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$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2$$

$$1.2 - 1.5 - 2 \cdot 2 = 0$$

$$X = -k \cdot \frac{1}{2} \cdot \frac{1}{2}$$

$$X = -k \cdot \frac{1}{2} \cdot \frac{1}{2}$$

$$X = -k \cdot \frac{1}{2} \cdot \frac{1}{2}$$

=

$$\frac{1}{f_x} \left(\frac{\partial f}{\partial x} \right)$$

$$U = \frac{1}{f_x}$$

$$\frac{1}{f_x} = - \frac{1}{f_x} \frac{\partial f}{\partial x} = \frac{1}{f_x} \frac{\partial f}{\partial x}$$

n

$$n \frac{\partial f}{\partial x} = - (n - 1)$$

for the case of a function of n variables

$$N \frac{\partial f}{\partial x} = \frac{\partial f}{\partial x}$$

$$\frac{\partial f}{\partial x} = \frac{\partial f}{\partial x}$$

11/12 2/3

11/12 2/3

$\int = \frac{1}{2} \ln + \frac{1}{2}$

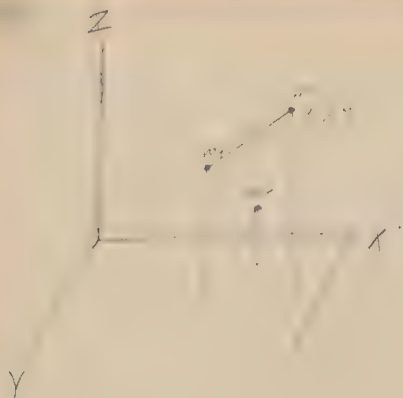
$\frac{1}{2} \ln + \frac{1}{2}$

$\therefore N = \frac{1}{2} \left[\frac{1}{2} \ln + \frac{1}{2} \right] + \frac{1}{2}$

$\frac{1}{2} \ln + \frac{1}{2} = \frac{1}{2} \ln + \frac{1}{2}$

6

$= 111$



$$X_1 = \frac{1}{\sqrt{2}}$$

$$X_2 = -\frac{1}{\sqrt{2}}$$

$$X = Y + Z$$

$$\frac{dX}{dt} = \frac{d(Y+Z)}{dt}$$

$$\frac{dX}{dt} = \frac{dY}{dt} + \frac{dZ}{dt}$$

$$x_1 + x_2 = x + \dots$$

$$x_1 + x_2 = x - x_1$$

$$X_1 = \frac{dY}{dt}$$

$$\frac{dX}{dt} = \frac{dY}{dt}$$

$$X_2 = \frac{dZ}{dt}$$

$$X_1 + X_2 = X = \frac{dY}{dt} + \frac{dZ}{dt} =$$

$$= \frac{d}{dt} (Y + Z)$$

4.

... ..

... ..



m.

WT

$$\frac{K \cdot \omega}{L} = \frac{L \cdot \omega}{L}$$

1.

2.

3. $L = \omega$

$$\lim_{x \rightarrow \infty} \frac{1}{x} = 0$$

or

$$\lim_{x \rightarrow \infty} \frac{1}{x} = 0$$

$$x' = a^2 - 1$$

$$x^2 = x'^2 - 1 - 2x' + 1$$

$$\frac{1}{x} = \frac{1}{x' - 1} = \frac{1}{x' - 1} \cdot \frac{x'}{x'} = \frac{x'}{x'^2 - 1}$$

$$\frac{1}{x} = \frac{x'}{x'^2 - 1}$$

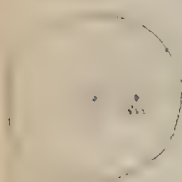
$$\frac{1}{2} \frac{d}{dx} \ln \frac{x+1}{x-1}$$

$$\frac{1}{2} \frac{d}{dx} \ln \frac{x+1}{x-1} = \frac{1}{2} \left(\frac{1}{x+1} - \frac{1}{x-1} \right)$$

$$\frac{1}{2} \frac{d}{dx} \ln \frac{x+1}{x-1} = \frac{1}{2} \left(\frac{1}{x+1} - \frac{1}{x-1} \right)$$

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left[\sqrt{a^2 + k^2} - k \right] = \frac{1}{2} \ln 2$$

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left(\sqrt{a^2 + k^2} - k \right) = \frac{1}{2} \ln 2$$



$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left(\sqrt{a^2 + k^2} - k \right) = \frac{1}{2} \ln 2$$

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left[\sqrt{a^2 + k^2} - k \right]$$

$$= \lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left(\sqrt{a^2 + k^2} - k \right)$$

$$= \frac{1}{2} \ln 2$$

$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left(\sqrt{a^2 + k^2} - k \right) = \frac{1}{2} \ln 2$
 $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \left(\sqrt{a^2 + k^2} - k \right) = \frac{1}{2} \ln 2$

1.



... ..

... ..

[...]

... ..

... ..

$$M = \frac{...}{3} \quad \text{...}$$

$$k \frac{M}{K} m = ...$$

$$\frac{1}{K} = \frac{...}{...} \quad \text{...}$$

... ..

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

$$\frac{1}{2} \frac{d^2 x}{dt^2} = -\frac{1}{2} \frac{d^2 y}{dt^2}$$

1. 1. 1. 1. 1.

2. 2. 2. 2. 2.

3. 3. 3. 3. 3.

4. 4. 4. 4. 4.

5. 5. 5. 5. 5.

6. 6. 6. 6. 6.

7. 7. 7. 7. 7.

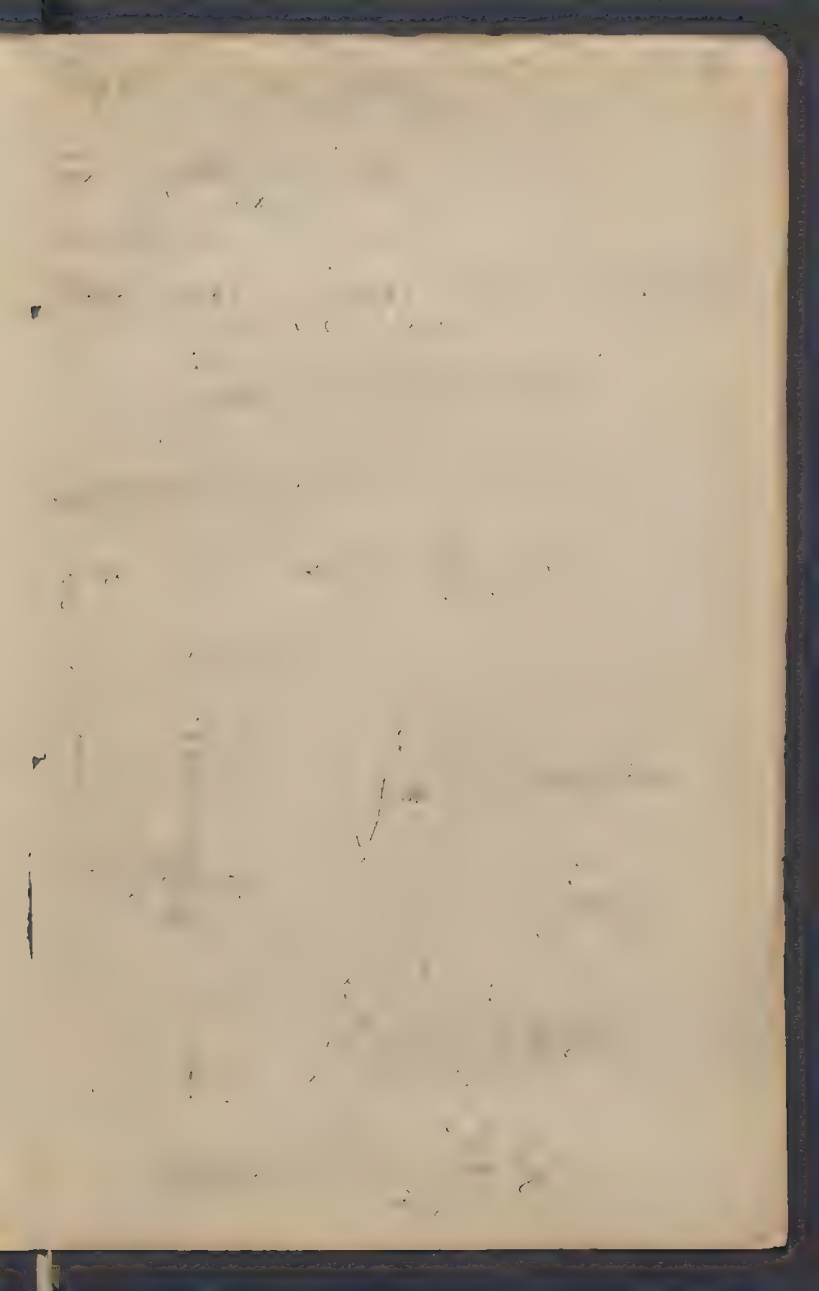
8. 8. 8. 8. 8.

9. 9. 9. 9. 9.

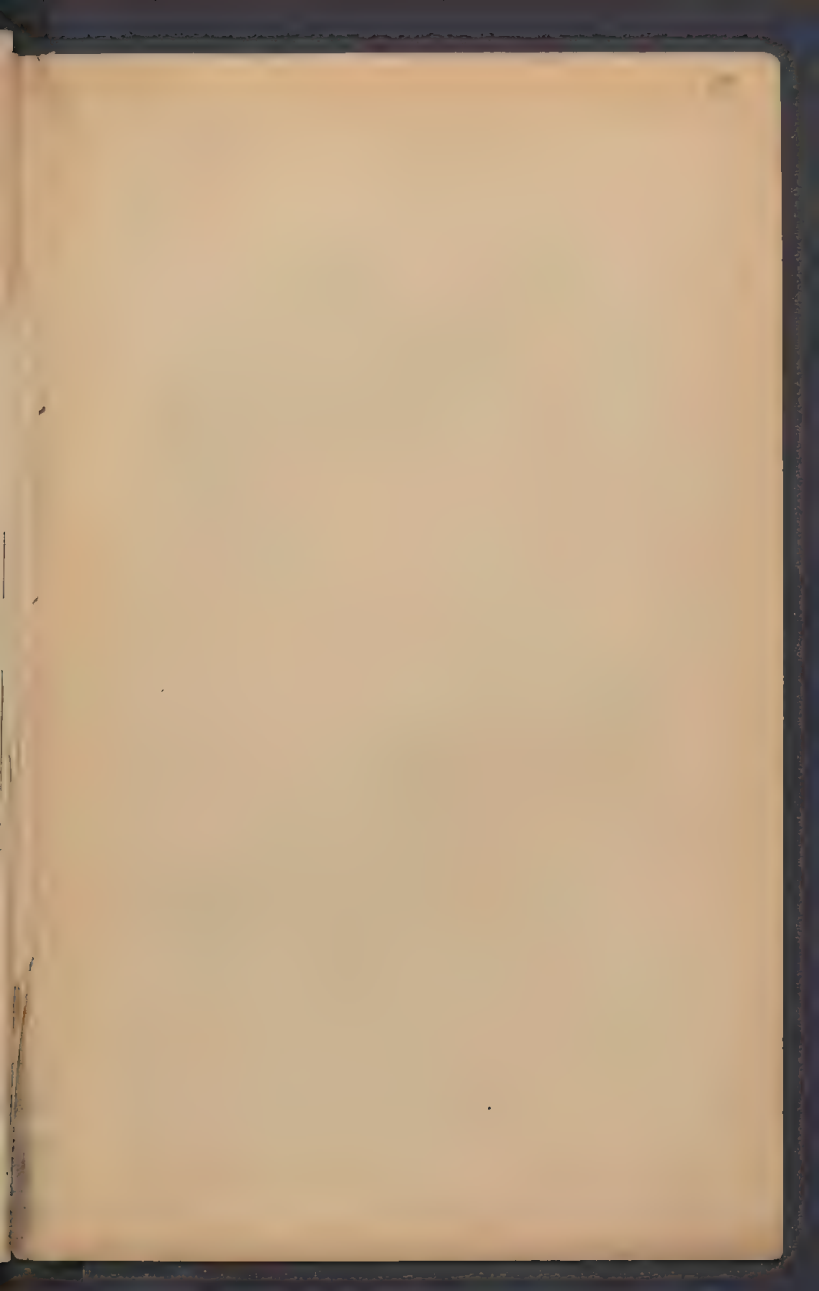
10. 10. 10. 10. 10.

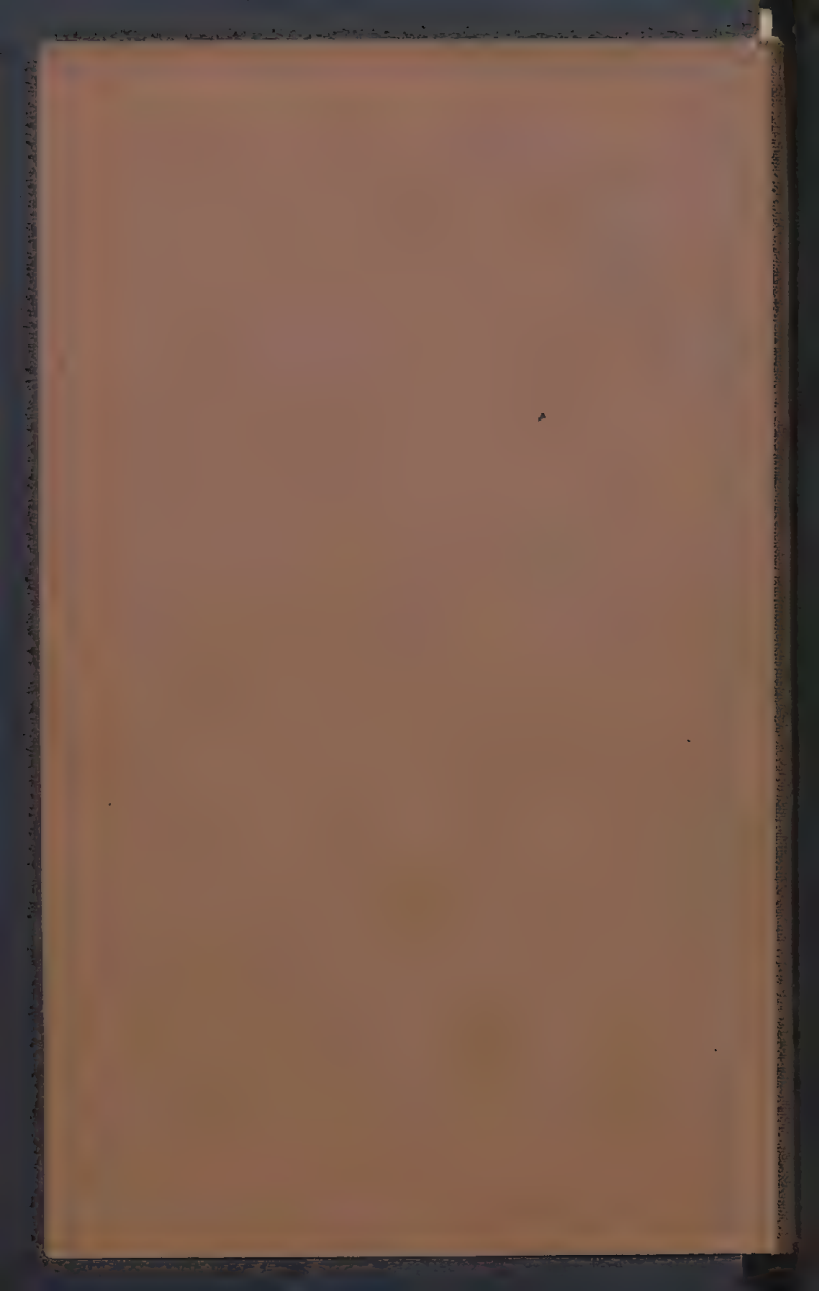
11. 11. 11. 11. 11.

12. 12. 12. 12. 12.



111





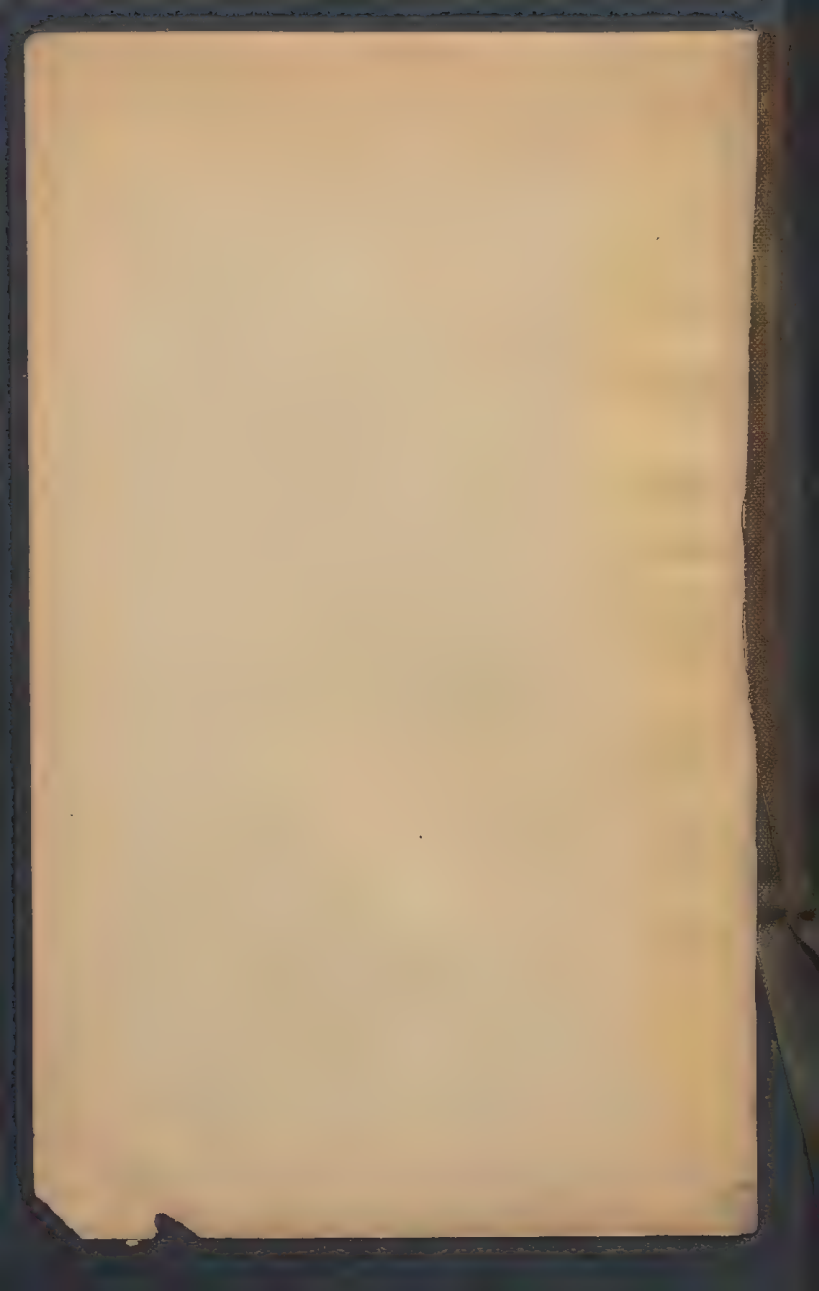
Dr. Josef Stefan

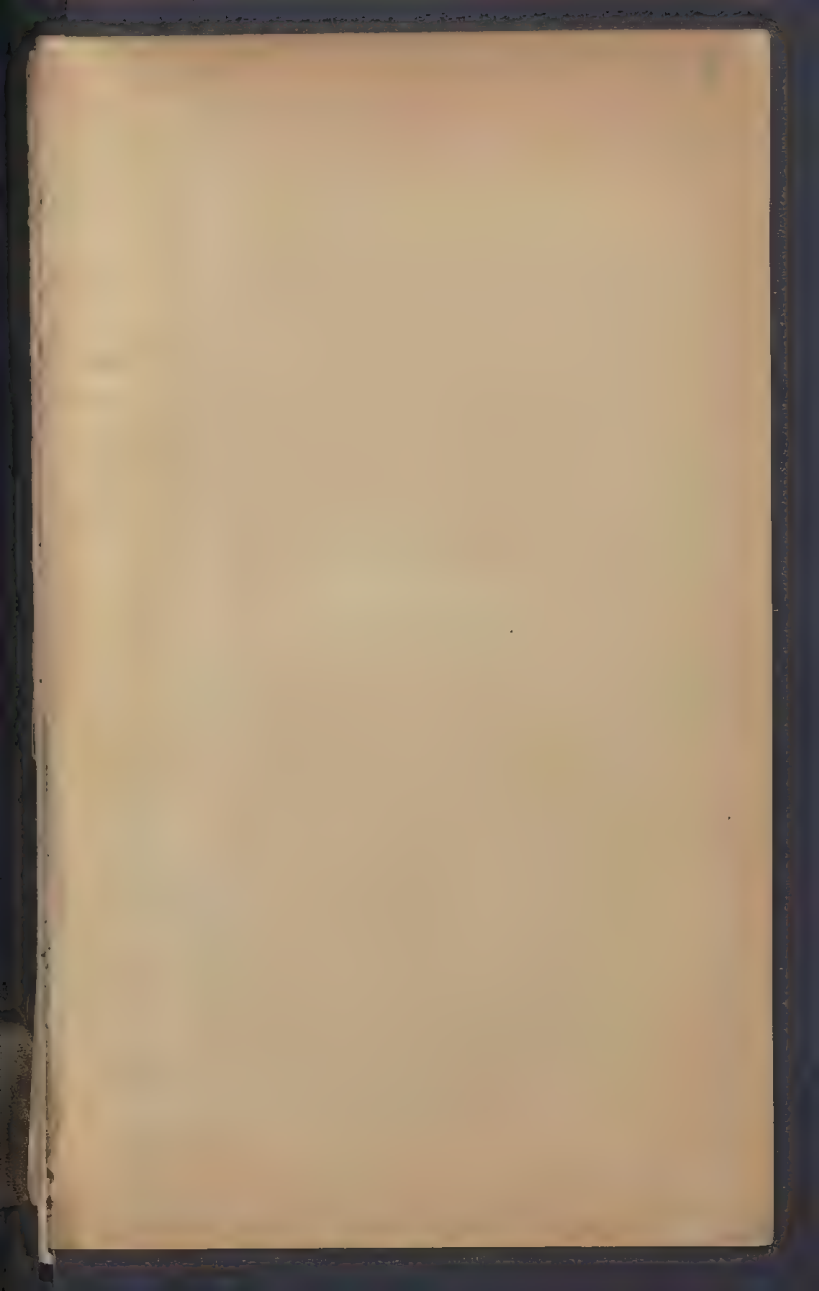
III.

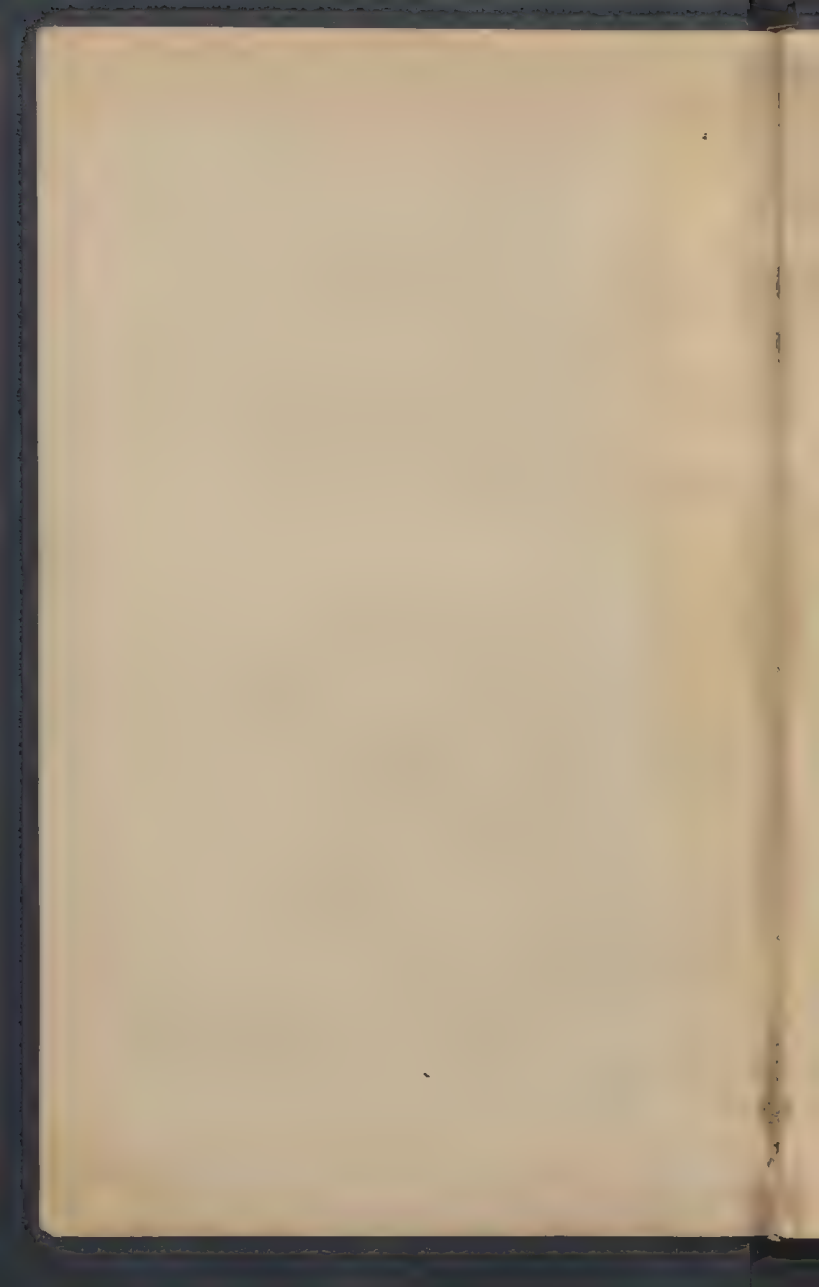
Mechanik

I.S. 4. 41. Admolutchowski

POLLY







1 - mg 3.

11 = 11. 11
+ N <

10



$$m = \frac{1}{2} \pi$$

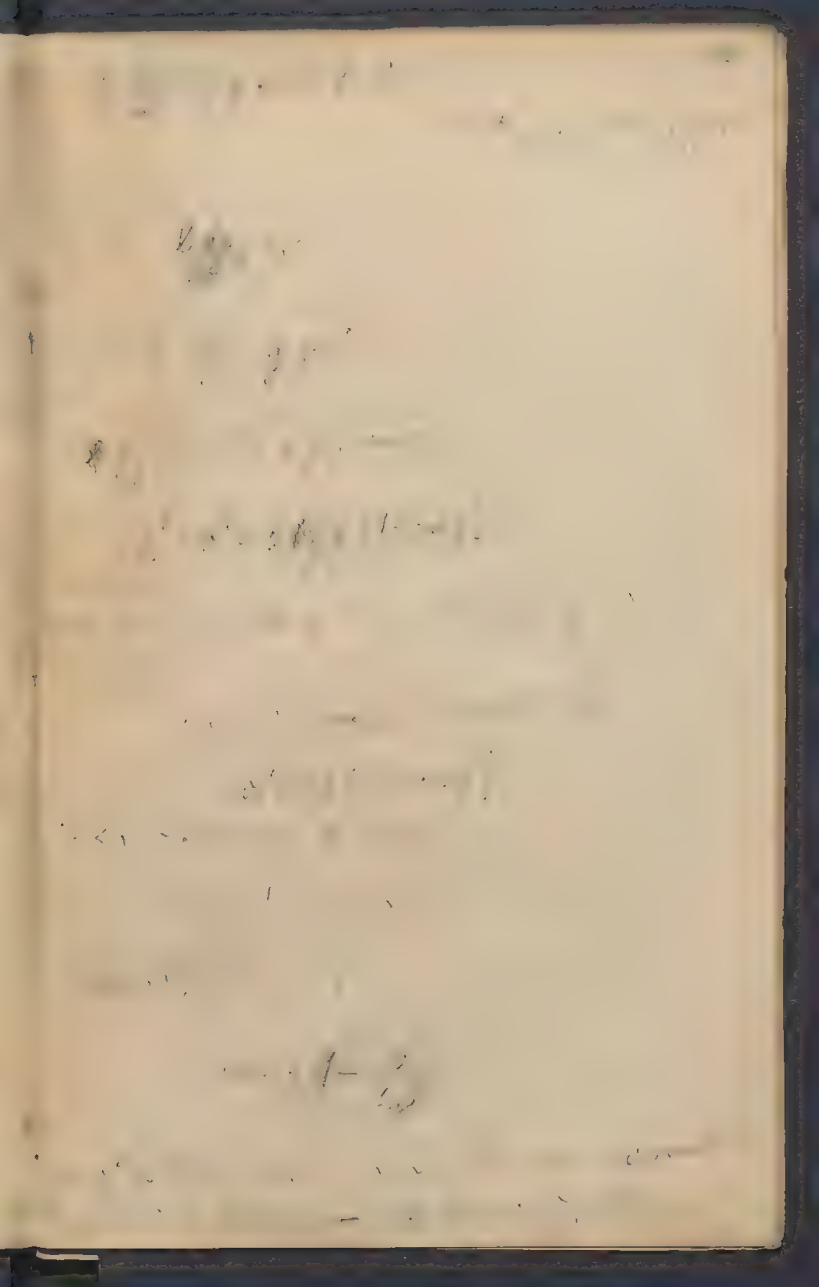
$$m = \frac{1}{2} \pi$$

$$m = \frac{1}{2} \pi$$

$$m = \frac{1}{2} \pi$$

$$m = \frac{1}{2} \pi$$

$$m = \frac{1}{2} \pi$$



9

1

24

= 0

$$J = g - \rho_1 + C$$

$$\frac{1}{2} \left(\frac{r_1}{r_2} - \frac{r_2}{r_1} \right) \frac{1}{\sqrt{r_1 r_2}}$$

+

2001

11

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

A

1000

$$t, \frac{2}{2} = 1$$

$$200 \text{ } 1000$$

$$27 \text{ } 40$$

$$T_2 \quad 1 \quad 1 \quad \frac{2}{2}$$

$$200 \text{ } 1000$$

$$1 \text{ } 2 \text{ } 10$$

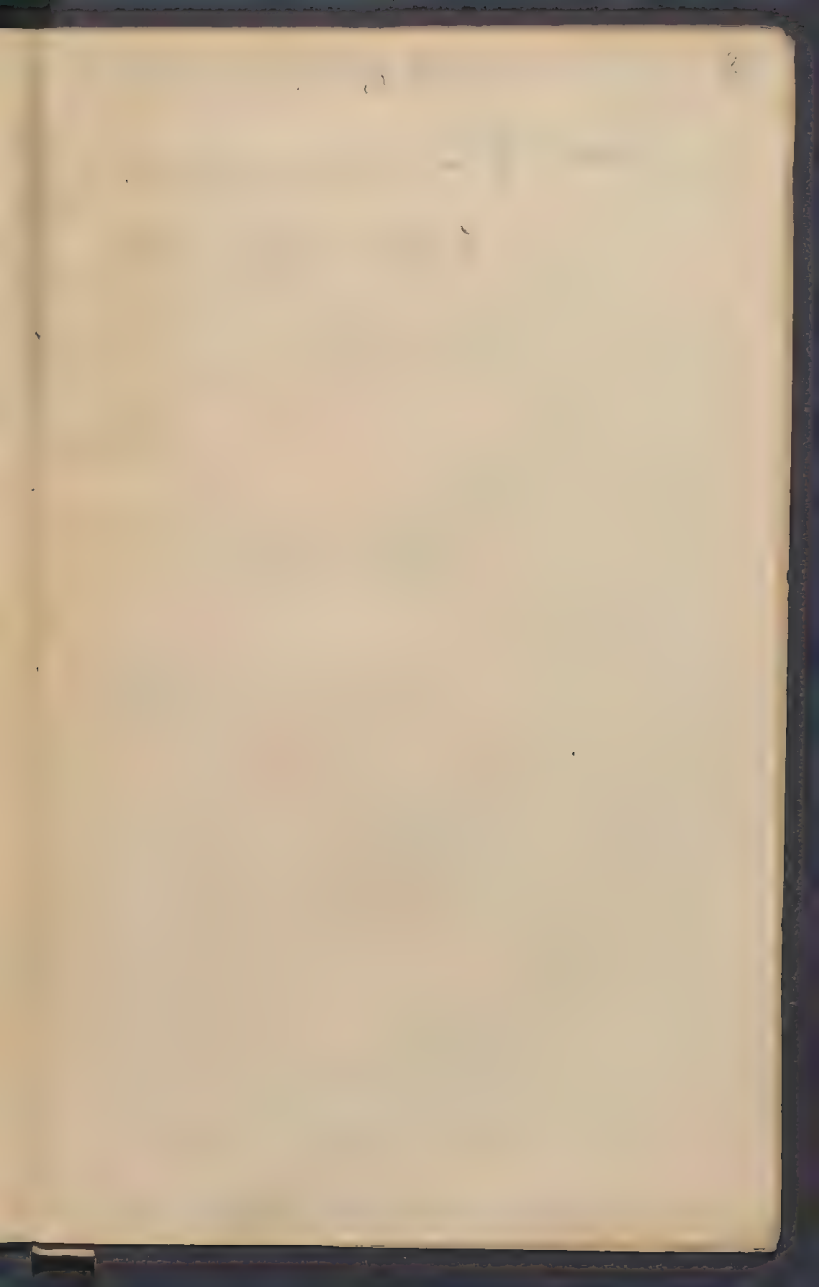
$$200 \text{ } 1000$$

$$200 \text{ } 1000$$

$$15:0 \quad | \quad t_4 \text{ } 10 \text{ } 20$$

$$t_1 \text{ } 10 \text{ } 10$$

$$200 \text{ } 1000$$



$$d. \quad \frac{1}{\sin \theta} \frac{d \sin \theta}{d \theta}$$

$$= \frac{1}{\sin^2 \theta}$$

$$= \frac{1}{\sin^2 \theta} \cdot \cos \theta \cdot \frac{d \theta}{d \theta}$$

$$= \frac{\cos \theta}{\sin^2 \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sin \theta}$$

4.

E.

180°

170°

+2

170°

170°

170°

P.

2

f

convergent

+

2

11

$\frac{1}{2} = \frac{1}{2} \cdot \frac{11}{4}$

$\frac{1}{4} = \frac{1}{4} \cdot \frac{11}{10}$

infinitesimal

$$m \frac{v^2}{2}$$

$$m \frac{v_1^2}{2}$$

$$m v_1^2 - m \frac{v_1^2}{2} = \int v$$

$$= m g H$$

$$H = \frac{v^2}{2g}$$

4

4

1

1

1

2

3

4

5

6

7

8

9

10

11

12

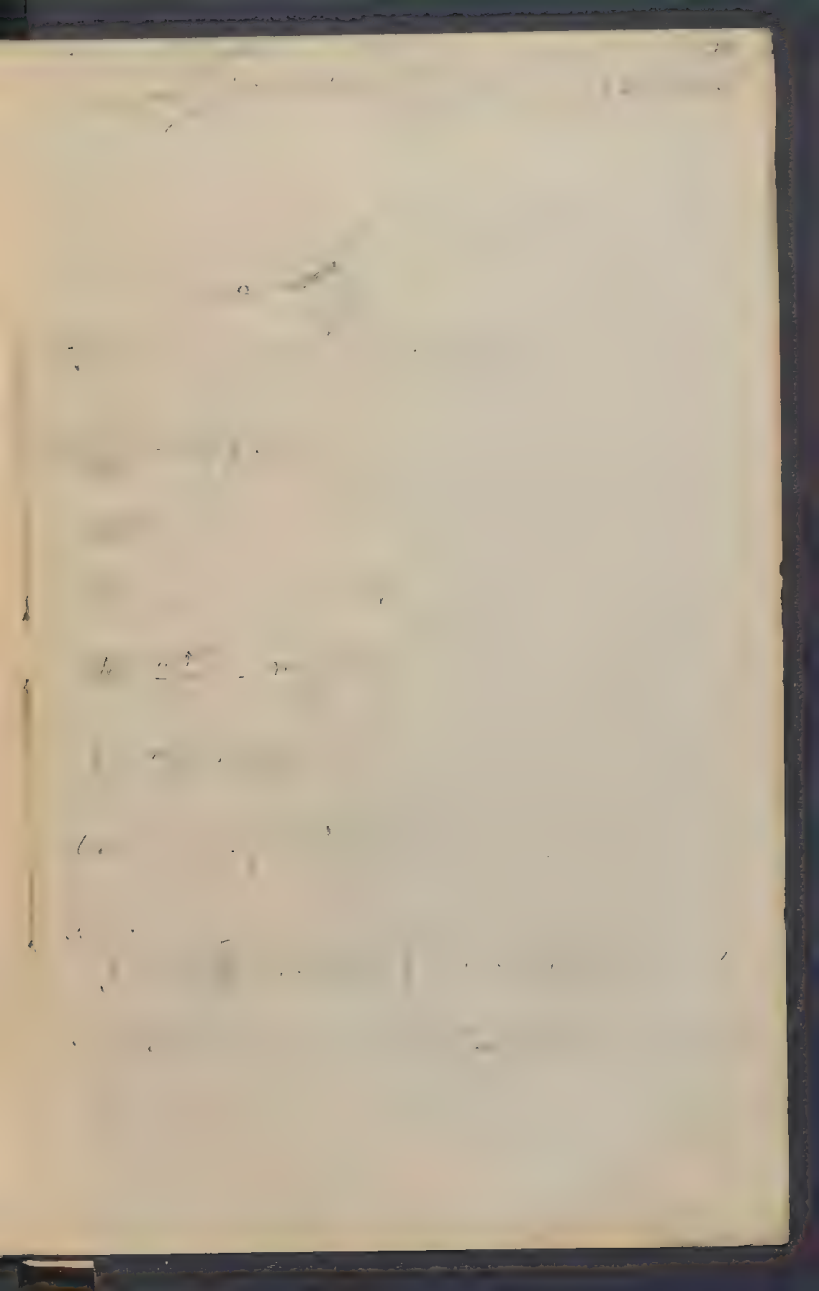
13

14

15

16

17



$\frac{1}{2} = \frac{1}{2}$
 $\frac{1}{2} = \frac{1}{2}$
 $\frac{1}{2} = \frac{1}{2}$

$$\frac{1}{2} = \frac{1}{2} \text{ on } \frac{1}{2}$$

$\frac{1}{2} = \frac{1}{2}$

$$\frac{1}{2} = \frac{1}{2} \text{ on } \frac{1}{2}$$

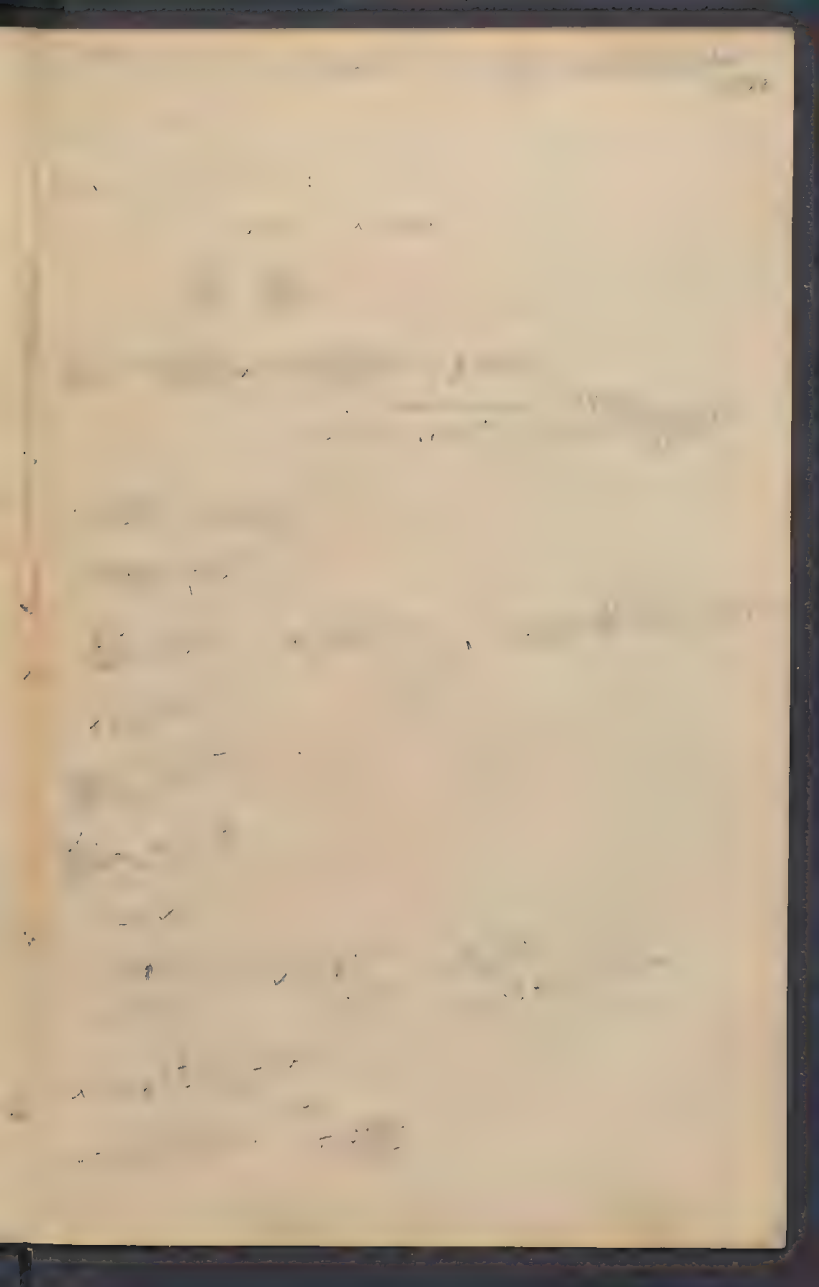
$\frac{1}{2} = \frac{1}{2}$

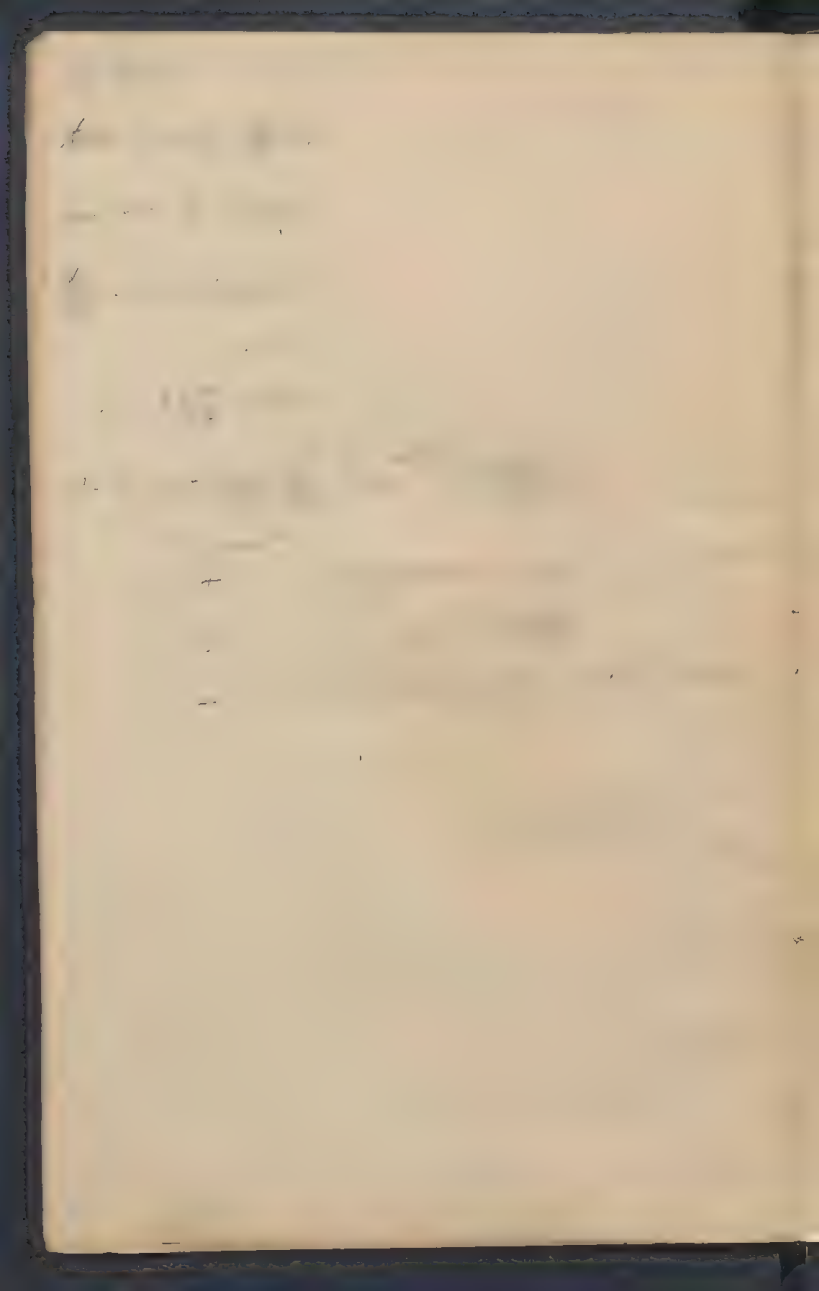
$$\frac{1}{2} = \frac{1}{2} \text{ on } \frac{1}{2}$$

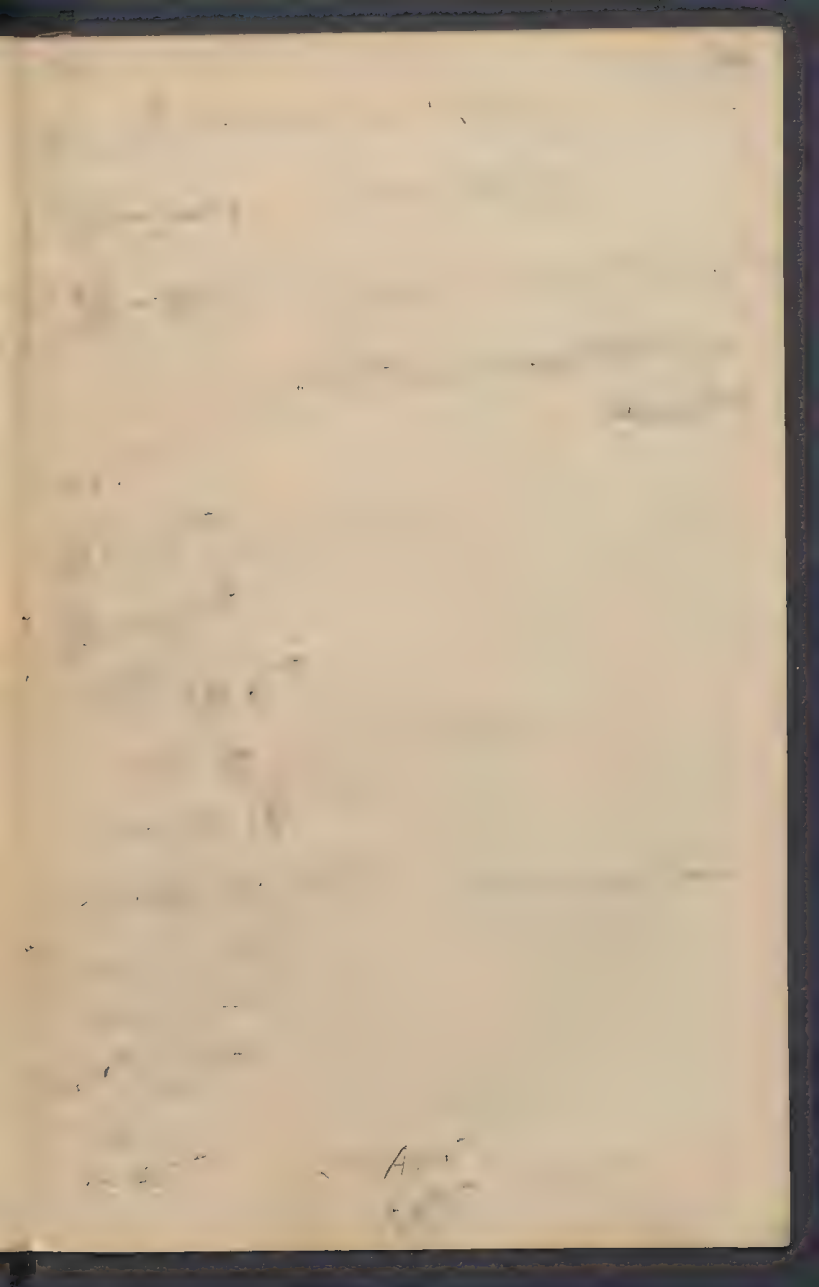
$\frac{1}{2} = \frac{1}{2}$

$$\frac{1}{2} = \frac{1}{2} \text{ on } \frac{1}{2}$$

$\frac{1}{2} = \frac{1}{2}$







1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

$$\frac{d^2 y}{dx^2} + \dots = 0$$

$$A e^{x^2}$$

$$I e^{x^2} [x^2 + 2x - 1] = 0$$

$$x = -b \pm \sqrt{b^2 - a^2}$$

$$a = -b - \sqrt{\dots}$$

1872

1. 1st of Jan. 1872
2. 2nd of Jan. 1872
3. 3rd of Jan. 1872
4. 4th of Jan. 1872
5. 5th of Jan. 1872
6. 6th of Jan. 1872
7. 7th of Jan. 1872
8. 8th of Jan. 1872
9. 9th of Jan. 1872
10. 10th of Jan. 1872
11. 11th of Jan. 1872
12. 12th of Jan. 1872
13. 13th of Jan. 1872
14. 14th of Jan. 1872
15. 15th of Jan. 1872
16. 16th of Jan. 1872
17. 17th of Jan. 1872
18. 18th of Jan. 1872
19. 19th of Jan. 1872
20. 20th of Jan. 1872
21. 21st of Jan. 1872
22. 22nd of Jan. 1872
23. 23rd of Jan. 1872
24. 24th of Jan. 1872
25. 25th of Jan. 1872
26. 26th of Jan. 1872
27. 27th of Jan. 1872
28. 28th of Jan. 1872
29. 29th of Jan. 1872
30. 30th of Jan. 1872
31. 31st of Jan. 1872

1. 1st of Feb. 1872
2. 2nd of Feb. 1872
3. 3rd of Feb. 1872
4. 4th of Feb. 1872
5. 5th of Feb. 1872
6. 6th of Feb. 1872
7. 7th of Feb. 1872
8. 8th of Feb. 1872
9. 9th of Feb. 1872
10. 10th of Feb. 1872
11. 11th of Feb. 1872
12. 12th of Feb. 1872
13. 13th of Feb. 1872
14. 14th of Feb. 1872
15. 15th of Feb. 1872
16. 16th of Feb. 1872
17. 17th of Feb. 1872
18. 18th of Feb. 1872
19. 19th of Feb. 1872
20. 20th of Feb. 1872
21. 21st of Feb. 1872
22. 22nd of Feb. 1872
23. 23rd of Feb. 1872
24. 24th of Feb. 1872
25. 25th of Feb. 1872
26. 26th of Feb. 1872
27. 27th of Feb. 1872
28. 28th of Feb. 1872
29. 29th of Feb. 1872
30. 30th of Feb. 1872
31. 31st of Feb. 1872

No. 11

$$-44 \int \cos t + \frac{2}{5} \sin t$$

1. The first part of the paper is devoted to a general discussion of the problem.

2. In the second part, we consider the case of a single particle.

3. The third part is devoted to the case of a system of particles.

4. In the fourth part, we consider the case of a continuous medium.

5. The fifth part is devoted to the case of a system of continuous media.

6. In the sixth part, we consider the case of a single continuous medium.

7. The seventh part is devoted to the case of a system of continuous media.

8. In the eighth part, we consider the case of a single continuous medium.

9. The ninth part is devoted to the case of a system of continuous media.

10. In the tenth part, we consider the case of a single continuous medium.

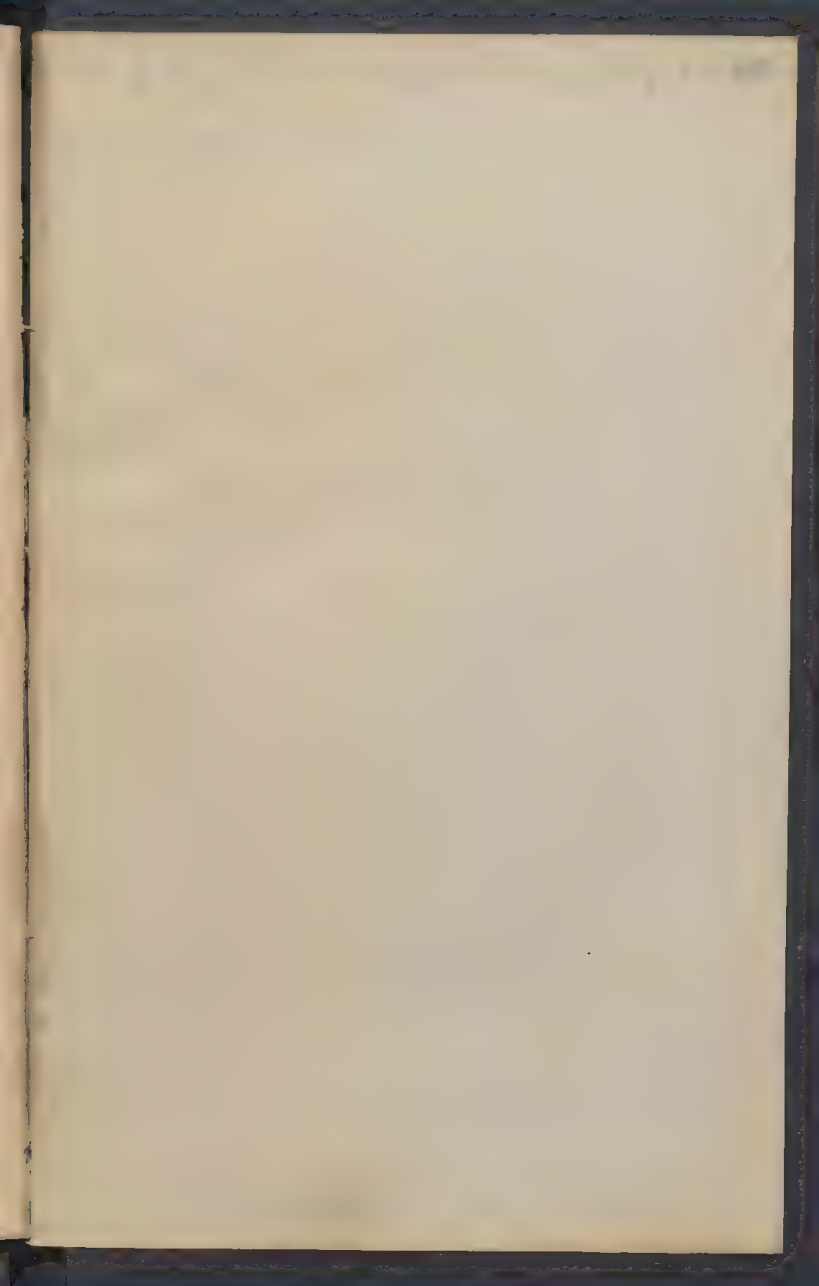
11. The eleventh part is devoted to the case of a system of continuous media.

12. In the twelfth part, we consider the case of a single continuous medium.

13. The thirteenth part is devoted to the case of a system of continuous media.

1871

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1. 1. 1.

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3. 3. 3.

4. 4. 4.

5. 5. 5.

6. 6. 6.

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13. 13. 13.

14. 14. 14.

15. 15. 15.

16. 16. 16.

17. 17. 17.

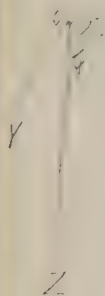
18. 18. 18.

19. 19. 19.

20. 20. 20.

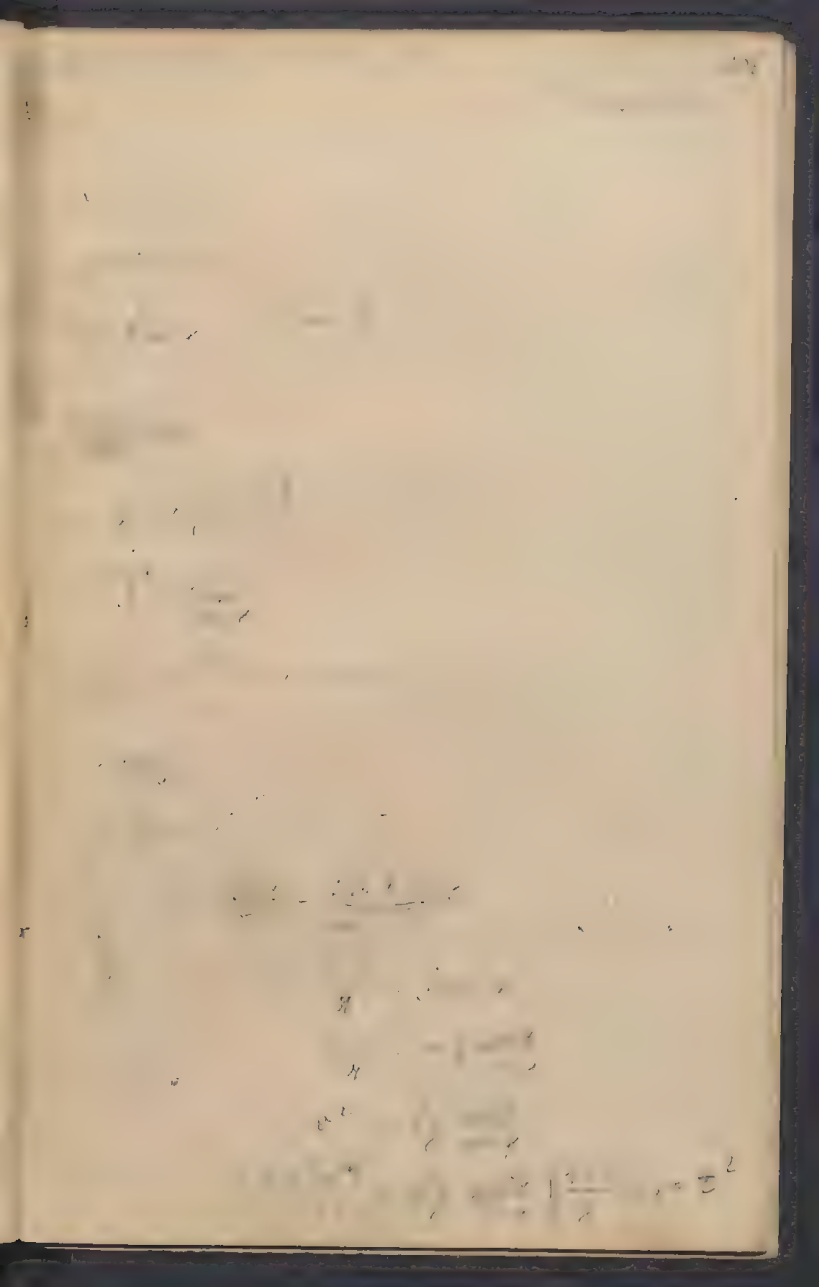
$$\begin{aligned} 1. \quad & \frac{1}{x^2} = x^{-2} \quad \therefore \frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3} \\ & \frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3} \end{aligned}$$

$$\frac{1}{x^2} = x^{-2}$$



$$m \frac{d^2 x}{dt^2} = -m \frac{d^2 y}{dt^2}$$

m



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111

$$= X + N \dots$$

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2. x . . .

1911

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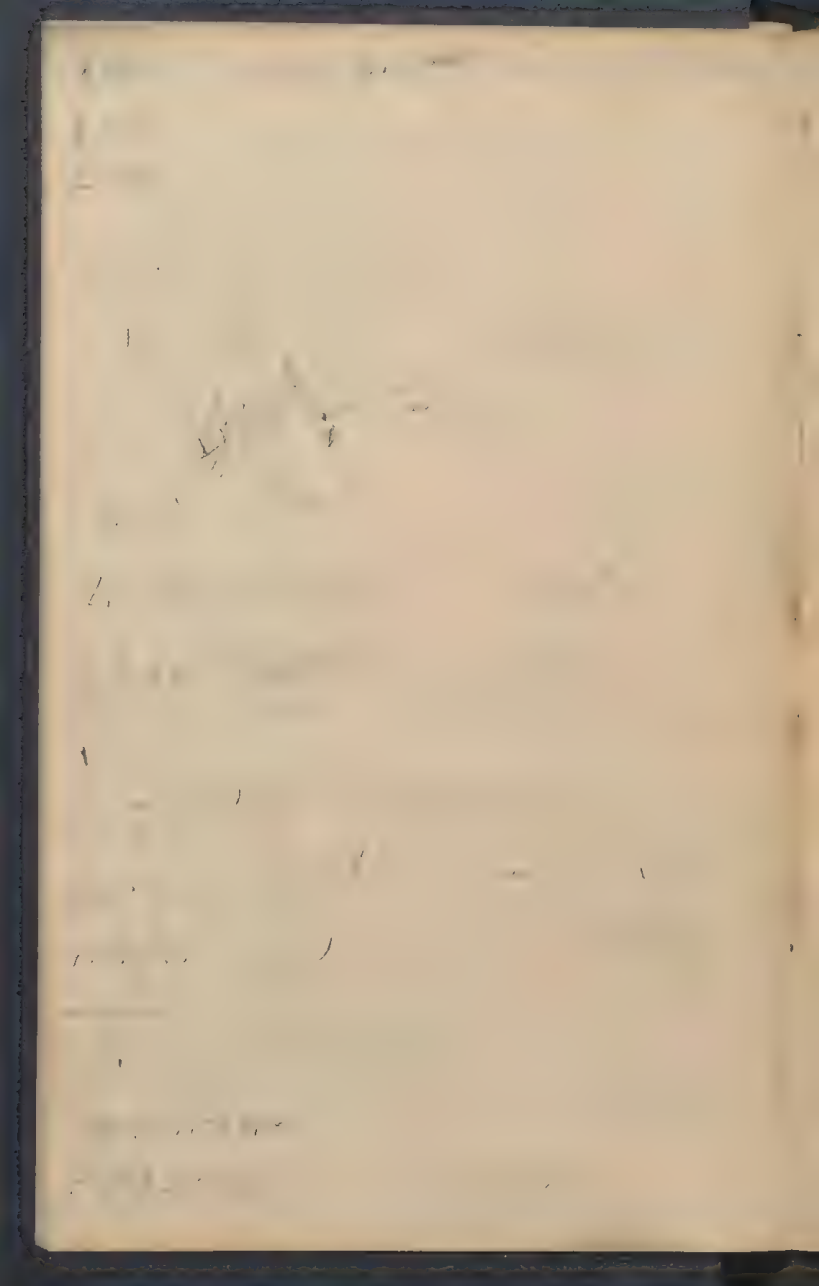
$X =$

X

Y

100

1911/11/22



VIII

XVII

XVIII

F

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

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$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d^2}{dt^2} \right) = \frac{1}{2} \frac{d^3}{dt^3}$

X

0.12

1.12

7

1.5 1.5

X + 1.5

X - 1.5 - 1.5 - 2.0

1.5 1.5

X - 1.5

X - 1.5

X.

Five

- 1/2 1/2 1/2 1/2 1/2

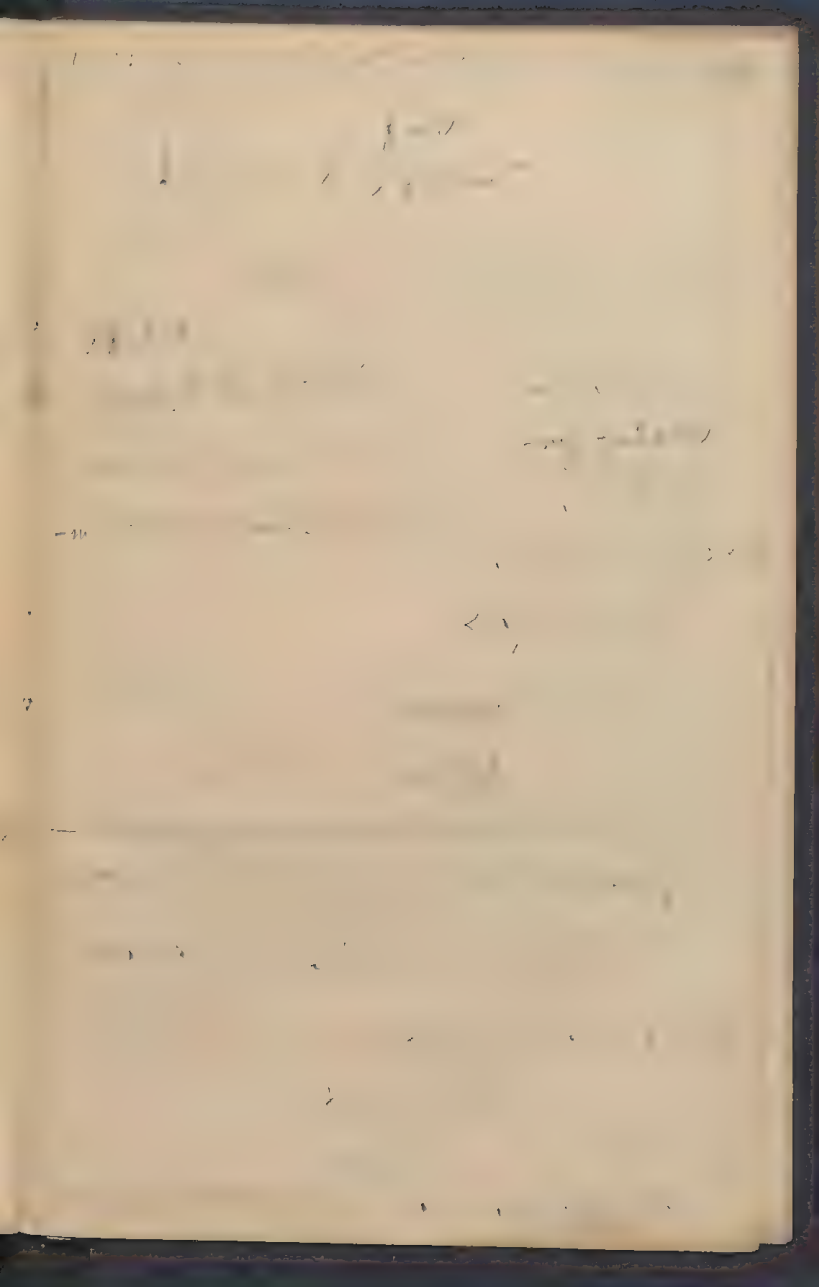
4 - 1/2 1/2 1/2 1/2 1/2

(X - 1) - 1/2 1/2 1/2 1/2 1/2

1 1/2 1/2 1/2 1/2 1/2

1 1/2 1/2 1/2 1/2 1/2

{ X - 1/2 1/2 1/2 1/2 1/2
Y - 1/2 1/2 1/2 1/2 1/2
Z - 1/2 1/2 1/2 1/2 1/2



April 20 1893

1893

X Y Z

~~100~~

11/

10x -

2

2.

$\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$

$\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$

$$X = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$$

$$\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$$
$$= 0$$

$$X = m \frac{1}{2} - \frac{1}{4}$$

$$V = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$$

$$Z = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$$

L_1

L_2

2-7-10

1891

1891

1891

X 2

1891

X 2

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Y

Y

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11-27

1. $\frac{1}{2} m \frac{dx^2}{dt^2} = - \frac{m}{2} \frac{dx^2}{dt^2}$

2. $\frac{1}{2} m \frac{dx^2}{dt^2} = - \frac{m}{2} \frac{dx^2}{dt^2}$

3. $\frac{1}{2} m \frac{dx^2}{dt^2} = - \frac{m}{2} \frac{dx^2}{dt^2}$

$$X \frac{dx}{dt} + V \frac{dx}{dt} + \frac{1}{2} m \frac{dx^2}{dt^2} = 0$$

$$X \frac{dx}{dt} + V \frac{dx}{dt} + \frac{1}{2} m \frac{dx^2}{dt^2} = 0$$

$$\frac{dx}{dt} \frac{dV}{dt} = \frac{dV}{dt} \frac{dx}{dt}$$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right) = \frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right)$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right) = \frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right)$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right) = \frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right)$

$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right) = \frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \dot{\phi}^2 + \frac{1}{2} \dot{\psi}^2 \right)$

2. 1. 1.

$$\frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2} = \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$= \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$\frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$= \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$= \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$= \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$m \frac{d^2x}{dt^2} = F$$

$$\frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2} = \frac{d}{dt} \left(\frac{dx}{dt} \right) = \frac{d^2x}{dt^2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

1. 1

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

1. 2

1. 1

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

1.

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

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[Faint, illegible handwriting throughout the page, possibly representing a list or account.]

$$X_1 + \dots + X_n$$

$$1 - \frac{1}{n}$$

$$\frac{1}{n} - \frac{1}{n^2}$$

$$1 - \frac{1}{n}$$

$$1 - \frac{1}{n}$$

$$1 - \frac{1}{n}$$

$$X_1 + \dots + X_n$$

$$X_1 = \frac{1}{\sqrt{1 - \frac{1}{n}}}$$

$$X_1 = \frac{1}{\sqrt{1 - \frac{1}{n}}}$$

$$\sum_{i=1}^n X_i$$

$$x = 1 \frac{x_2 - x_1}{x_2 - x_1}$$

0

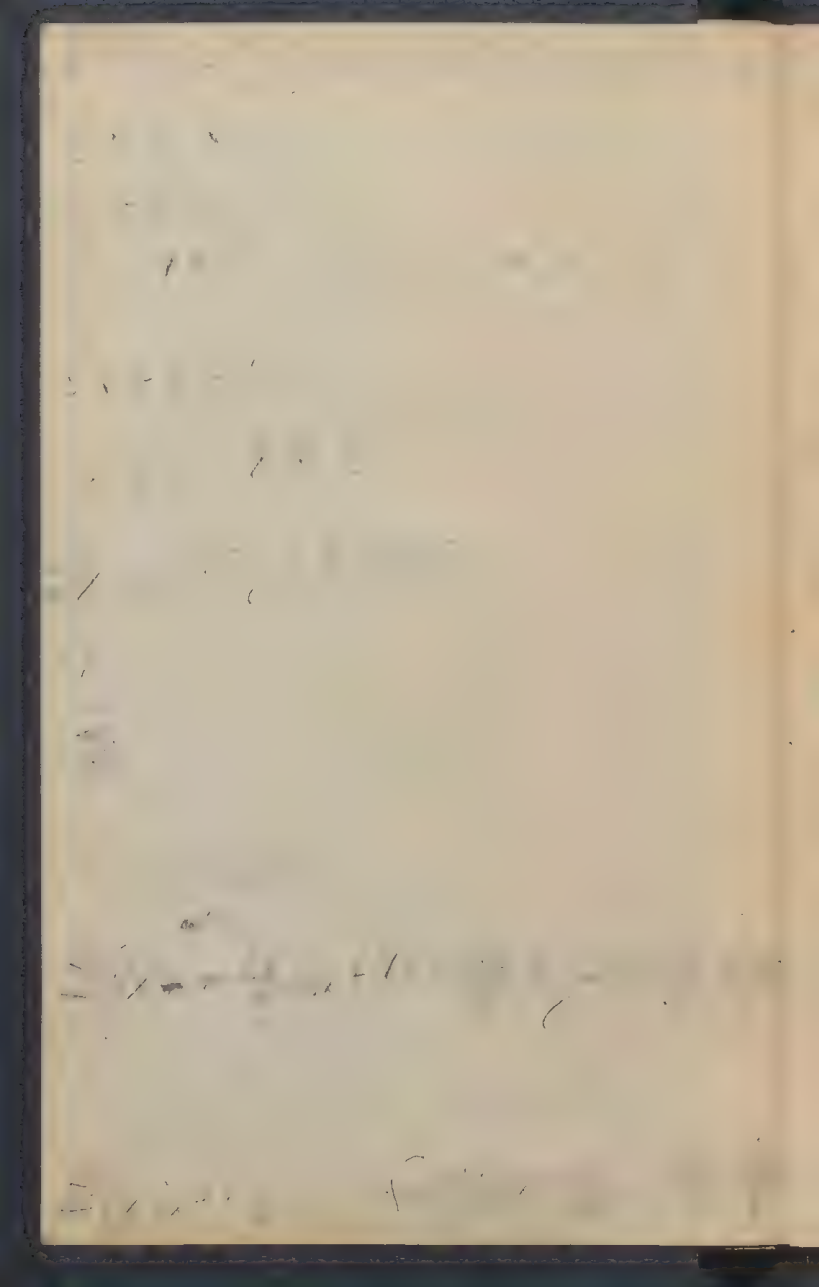
$$(x_2 - x_1)^2 + (z_2 - z_1)^2$$

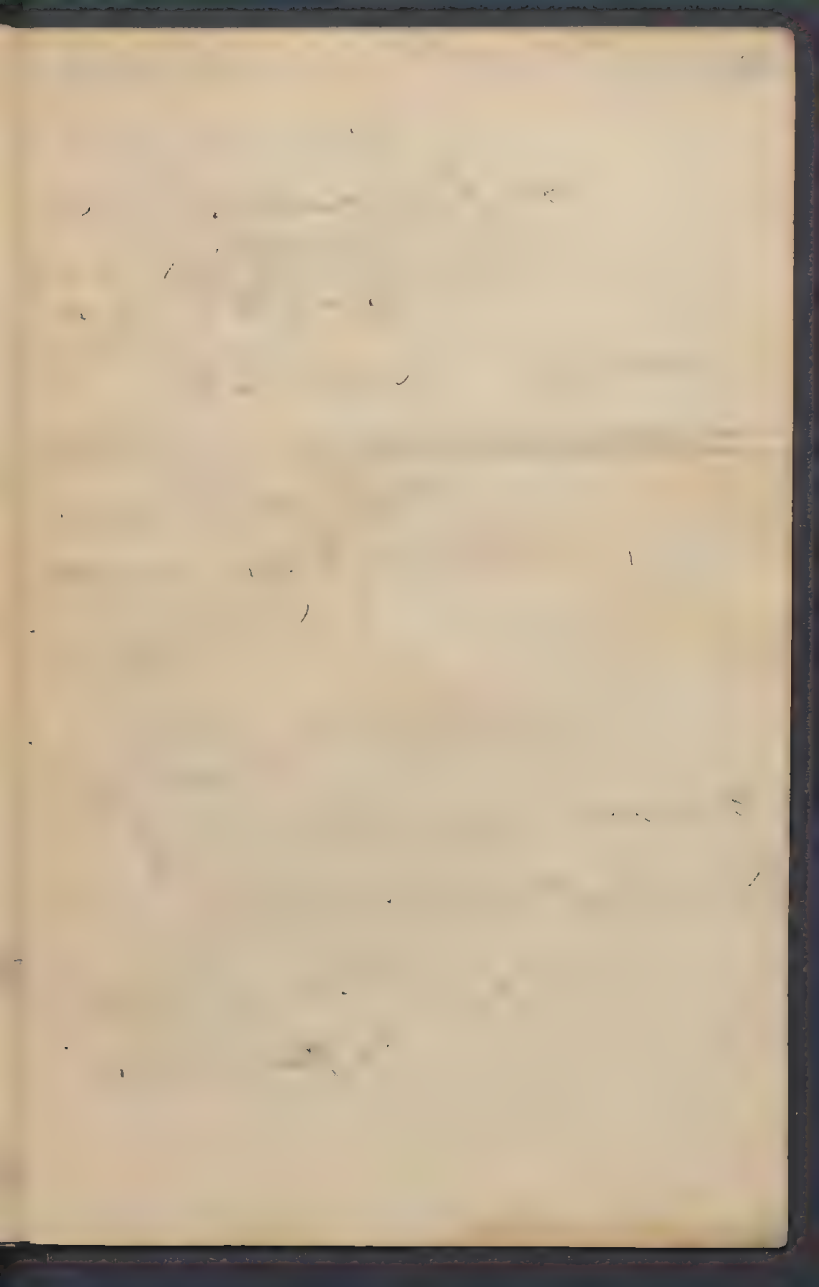
$$x_1, x_2, z_1, z_2, \dots, (x_2 - x_1) = 0$$

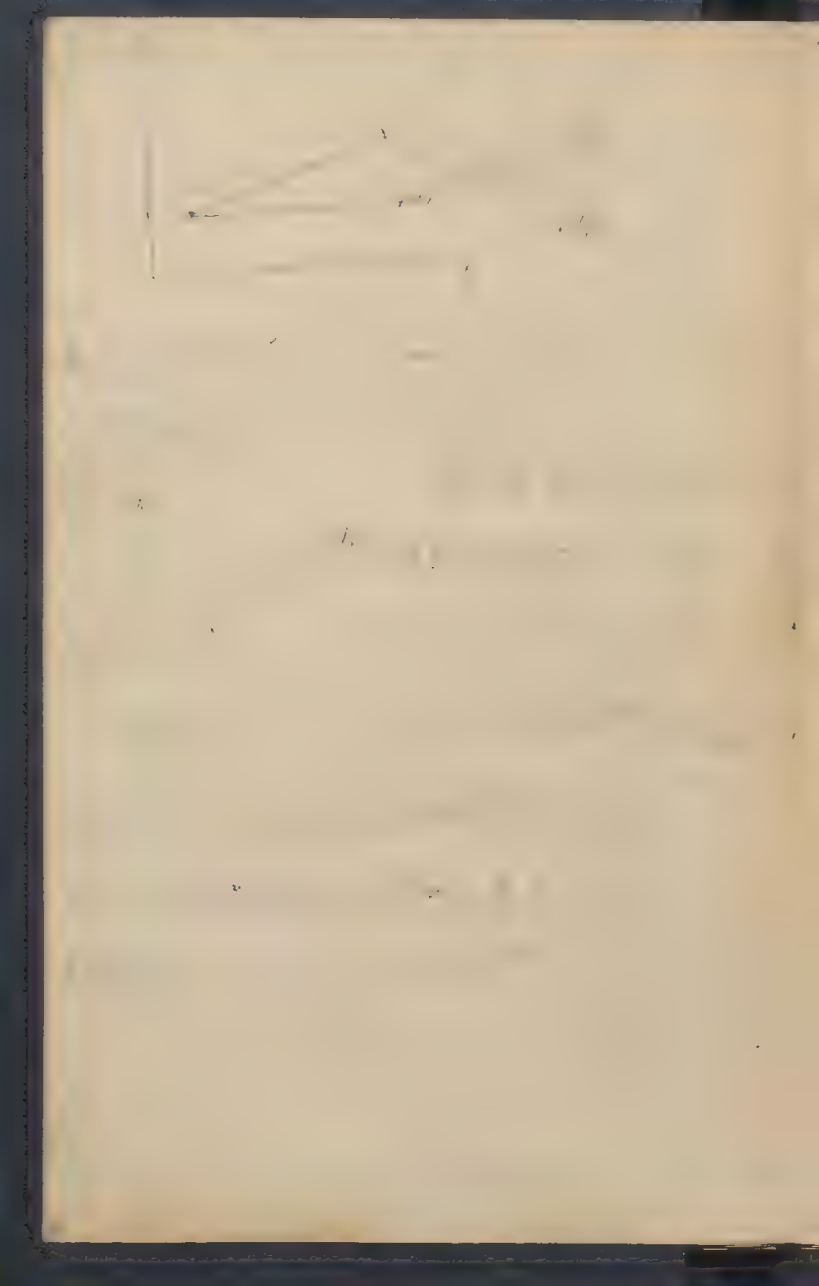
$$x \dots \dots \dots 0 \dots 0$$

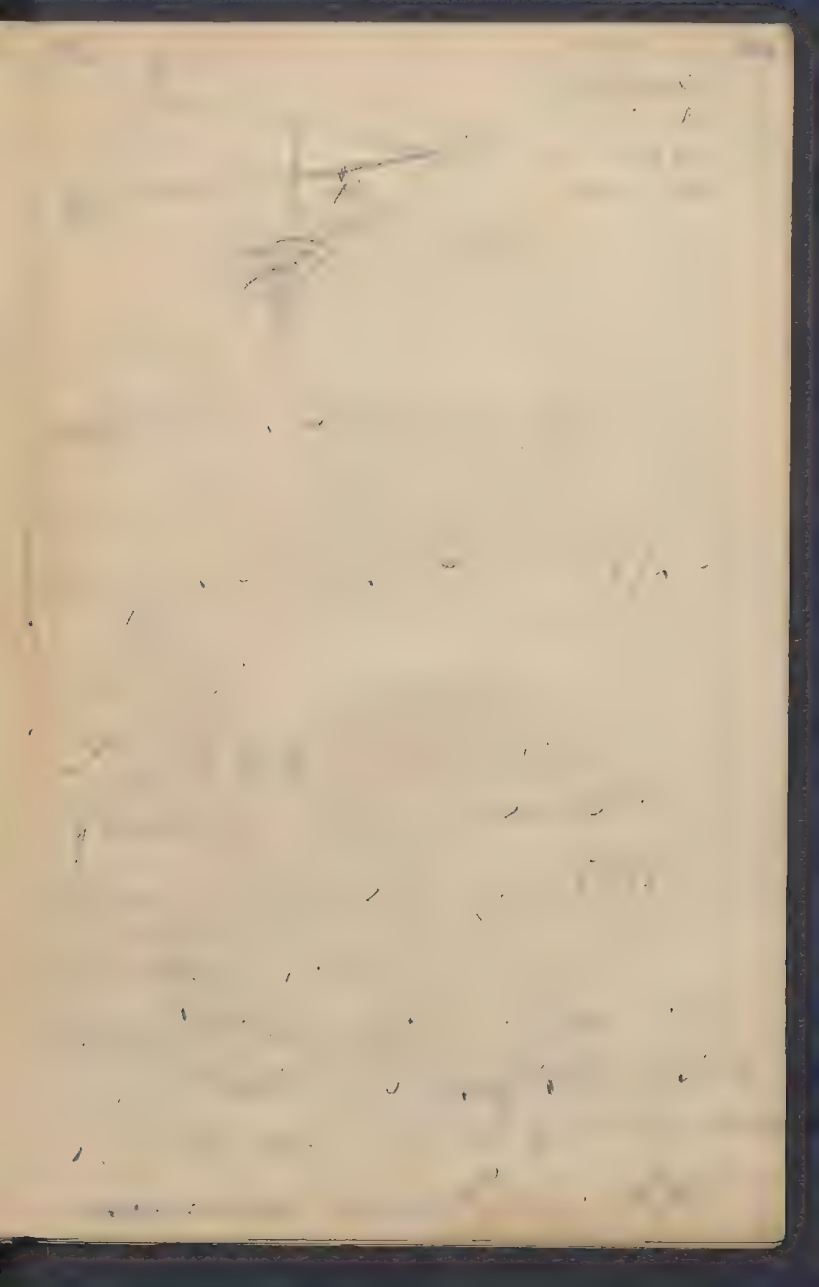
$$\sqrt{\dots}$$

$$\dots$$







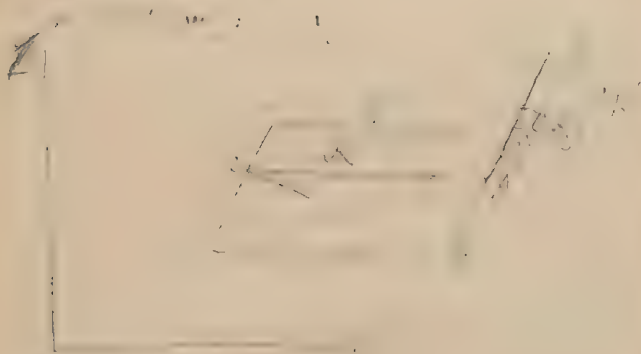


1



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p



111

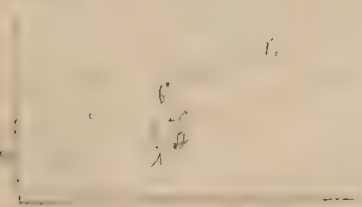
111 + 111

111 = 0

111 + 111

3

P_1



$$x_1 = -x_1$$

$$x_1 - x_1$$

$$x_1 - x_1 = x_1 - x_1$$

1. 1. 1.

2. 2. 2.

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4. 4. 4.

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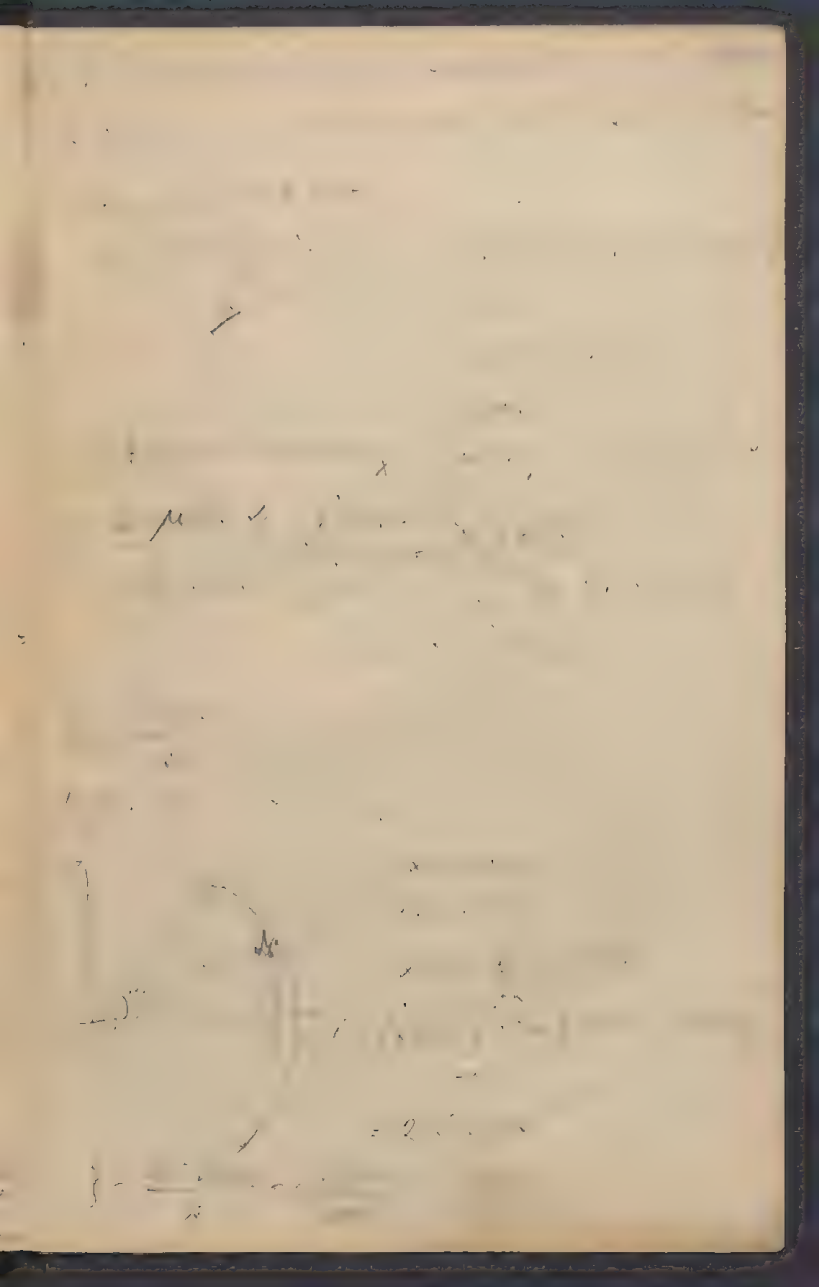
16. 16. 16.

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10-1-18

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0.2

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$$d = d_0 \sqrt{1 + \frac{v^2}{c^2}}$$

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Handwritten text, possibly a label or note.

$$= \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$= \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

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$$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + C$$

$$\int \frac{1}{\sqrt{a^2-x^2}} dx = \arcsin \frac{x}{a} + C$$

$$\int \frac{1}{\sqrt{x^2-a^2}} dx = \ln \left| \frac{x}{a} + \sqrt{\frac{x^2}{a^2} - 1} \right| + C$$

$$\int \frac{1}{x^2} dx = -\frac{1}{x} + C$$

$$\int \frac{1}{x^3} dx = -\frac{1}{2x^2} + C$$

$$\int \frac{1}{x^4} dx = -\frac{1}{3x^3} + C$$

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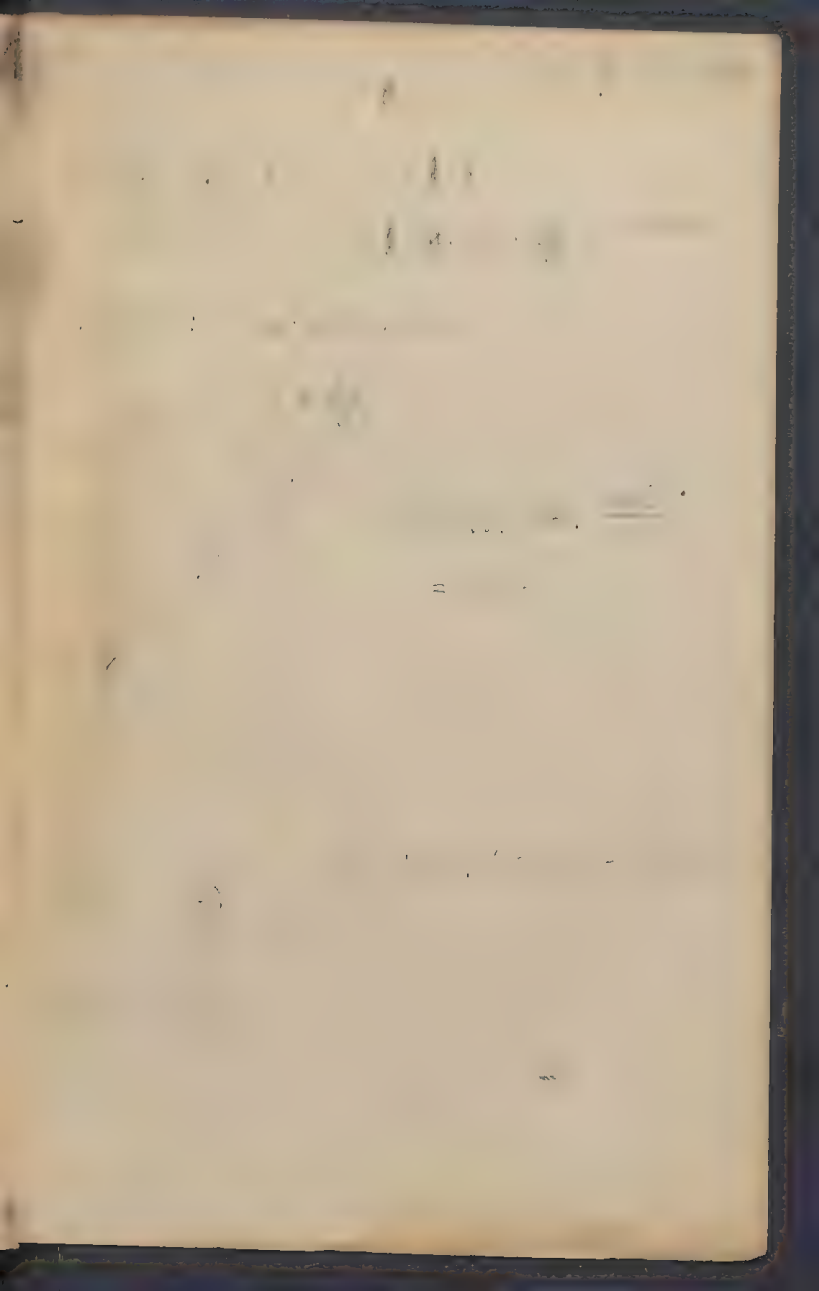
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1.

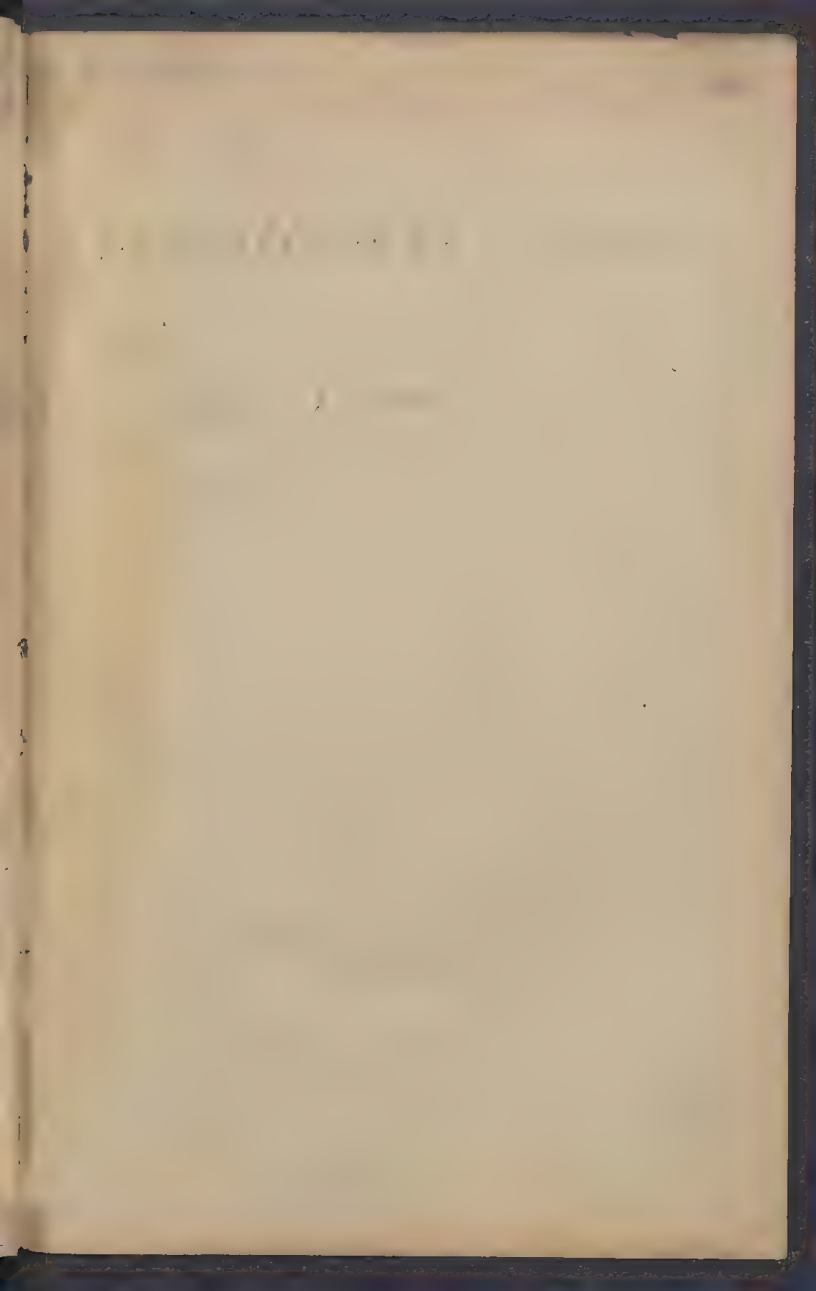
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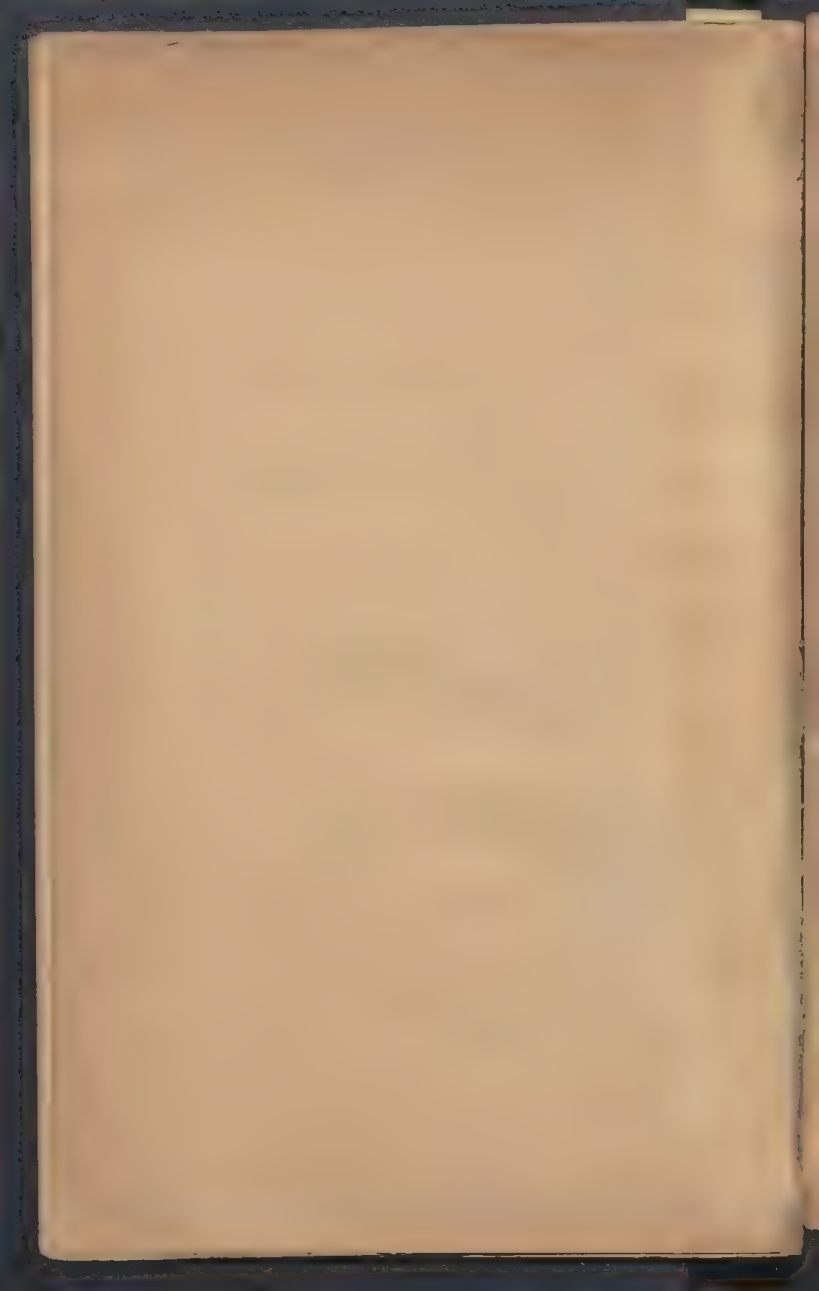
9A33

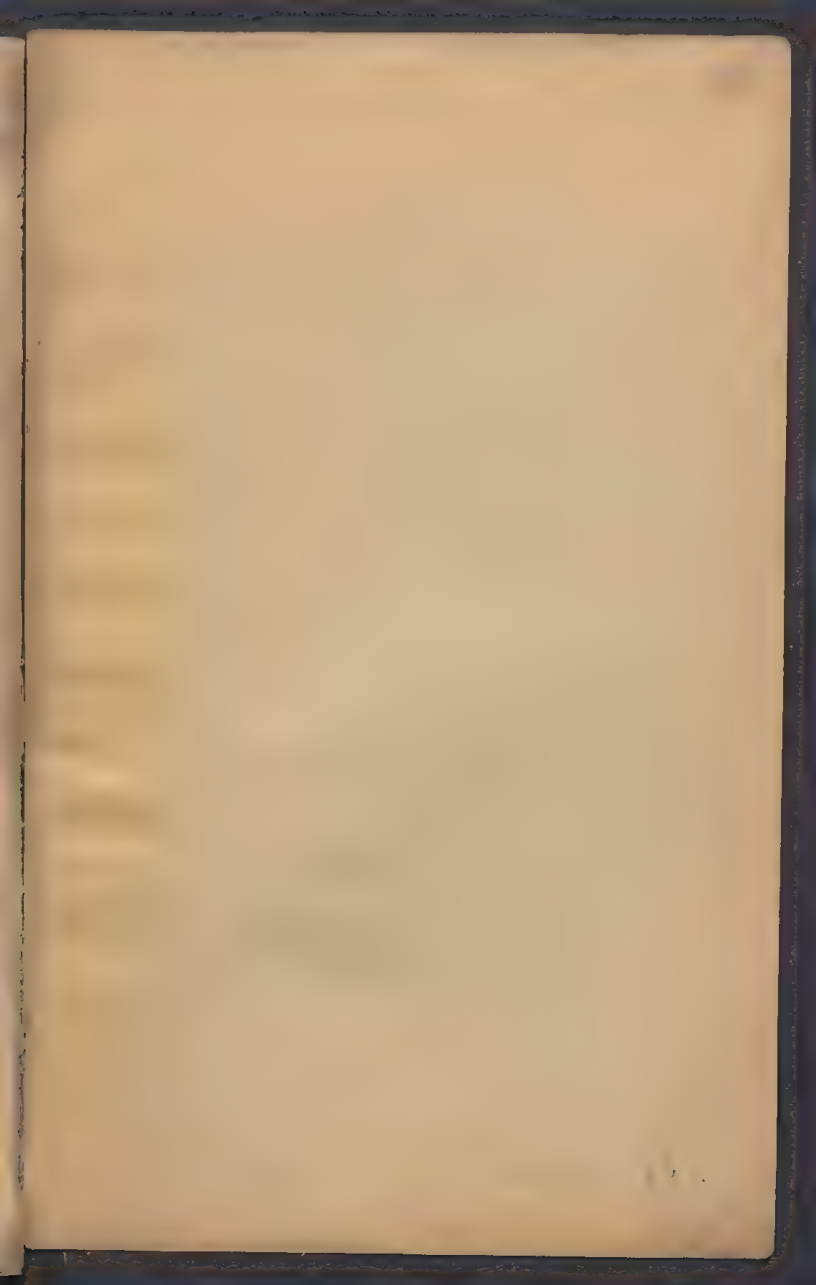
A

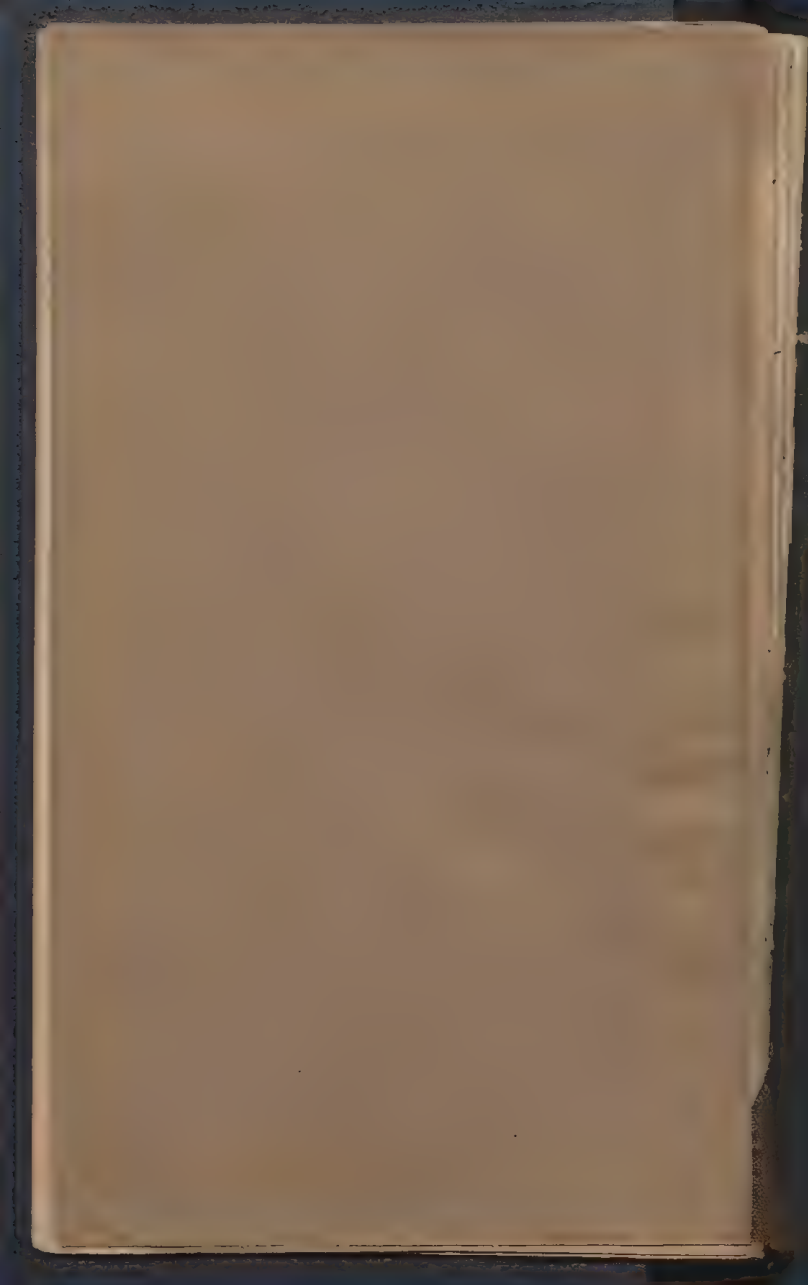
2

4)



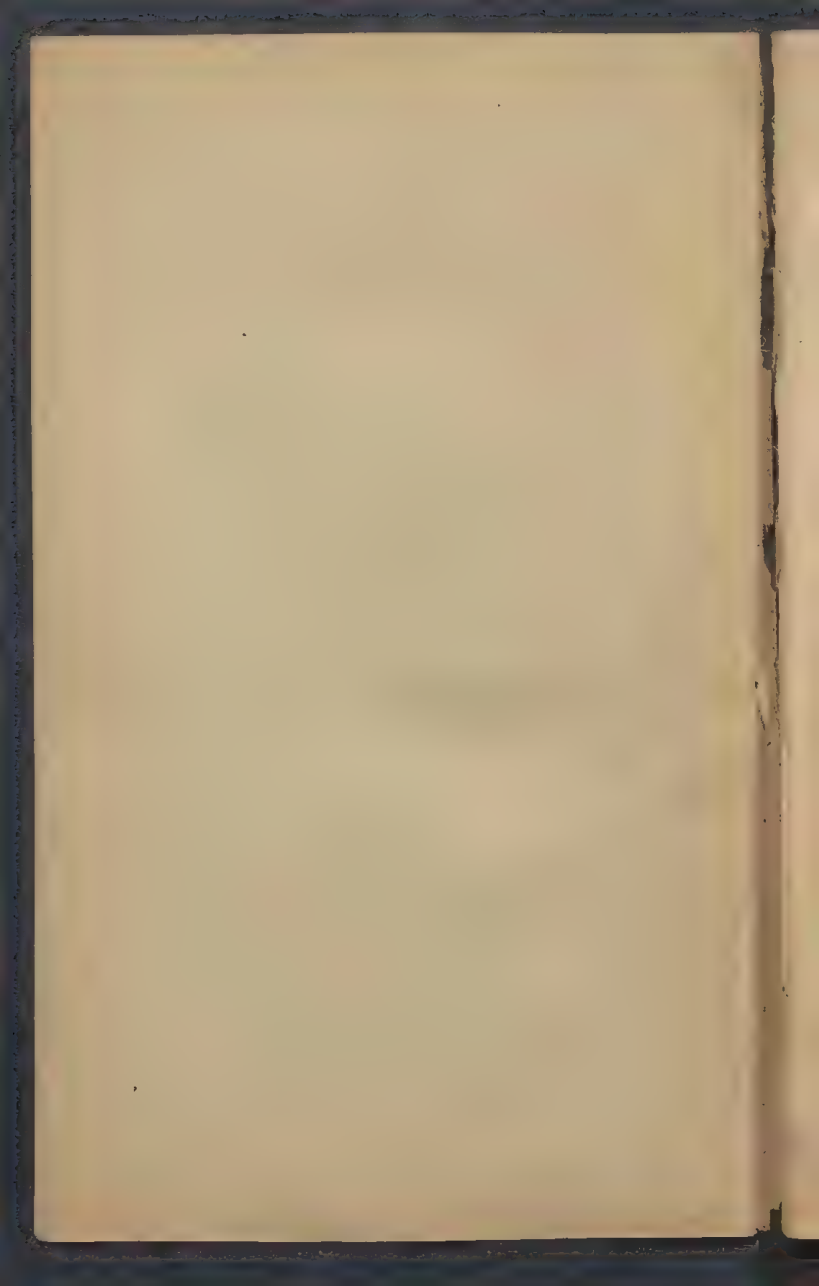


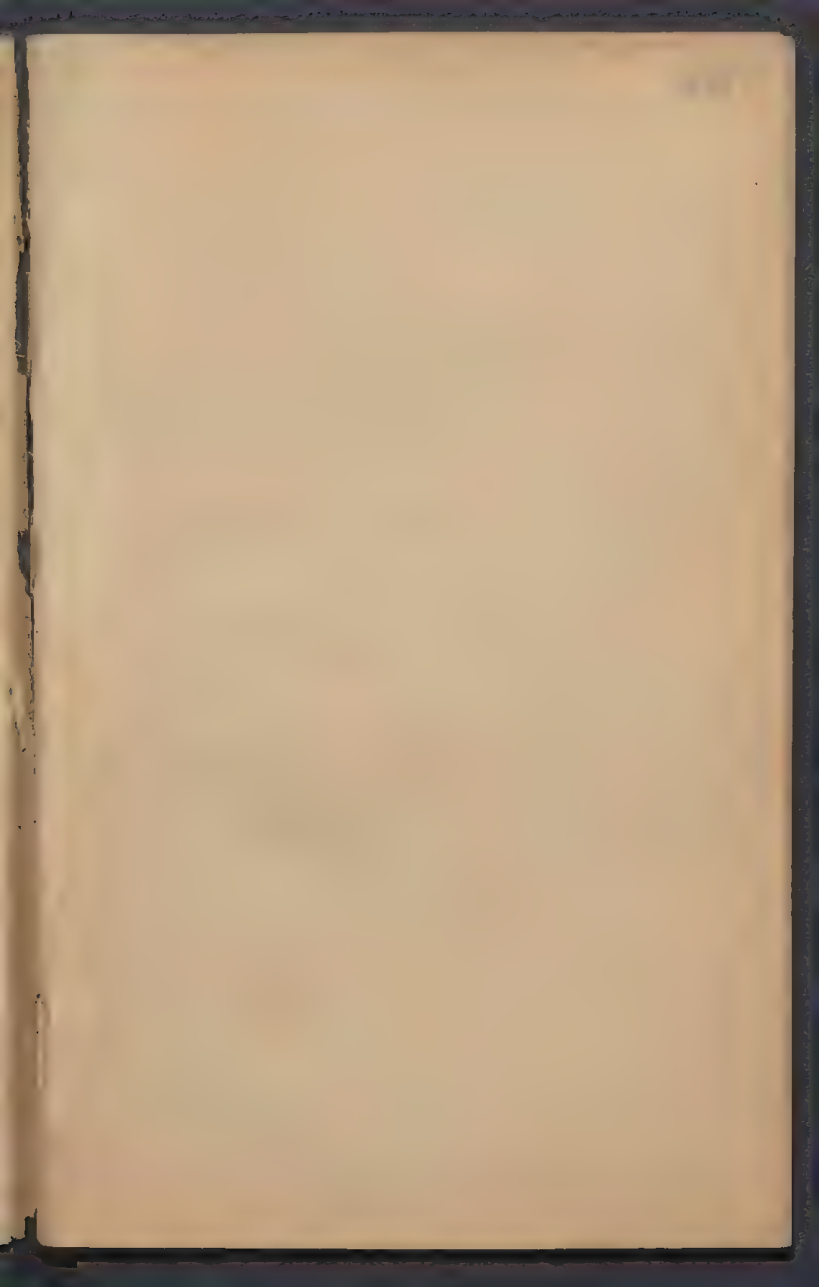




PAPIER HANDELUNG

POLLY, IV KAPOLHENG





x =

$$\frac{1}{x} = \frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{\frac{1}{x}} = x$$

$$\frac{1}{\frac{1}{x}} = \frac{1}{\frac{1}{x}} = x$$

$$= \frac{1}{\frac{1}{x}} = x$$

$$\frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{\frac{1}{x}} = x$$

$$x = \frac{1}{2} \left(\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}} \right)$$

$$y = \frac{1}{2} \left(\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}} \right)$$

$$x^2 + y^2 = \frac{1}{4} \left(\left(\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}} \right)^2 + \left(\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}} \right)^2 \right)$$

$$= \frac{1}{4} \left(1 + \frac{4}{a^2} + 1 - \frac{4}{a^2} + 1 + \frac{4}{a^2} + 1 - \frac{4}{a^2} \right) = \frac{1}{4} (4) = 1$$

$$\frac{1}{x} = \frac{2}{\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}}} = \frac{2}{2} \cdot \frac{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}}{\left(\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}} \right) \left(\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}} \right)} = \frac{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}}$$

$$= \frac{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}}$$

$$\frac{1}{y} = \frac{2}{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}} = \frac{2}{2} \cdot \frac{\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}}}{\left(\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}} \right) \left(\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}} \right)} = \frac{\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}} + \frac{\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}} = \frac{2\sqrt{1 + \frac{4}{a^2}}}{1 - \frac{4}{a^2}}$$

$$\frac{1}{x} - \frac{1}{y} = \frac{\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}} - \frac{\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}} = \frac{-2\sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}}$$

$$\frac{1}{x} \cdot \frac{1}{y} = \frac{\left(\sqrt{1 + \frac{4}{a^2}} - \sqrt{1 - \frac{4}{a^2}} \right) \left(\sqrt{1 + \frac{4}{a^2}} + \sqrt{1 - \frac{4}{a^2}} \right)}{\left(1 - \frac{4}{a^2} \right)^2} = \frac{1 - \frac{4}{a^2}}{\left(1 - \frac{4}{a^2} \right)^2} = \frac{1}{1 - \frac{4}{a^2}}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{2\sqrt{1 + \frac{4}{a^2}}}{1 - \frac{4}{a^2}} = \frac{2\sqrt{1 + \frac{4}{a^2}}}{\frac{a^2 - 4}{a^2}} = \frac{2a^2 \sqrt{1 + \frac{4}{a^2}}}{a^2 - 4}$$

$$\frac{1}{x} - \frac{1}{y} = \frac{-2\sqrt{1 - \frac{4}{a^2}}}{1 - \frac{4}{a^2}} = \frac{-2\sqrt{1 - \frac{4}{a^2}}}{\frac{a^2 - 4}{a^2}} = \frac{-2a^2 \sqrt{1 - \frac{4}{a^2}}}{a^2 - 4}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{2a^2 \sqrt{1 + \frac{4}{a^2}}}{a^2 - 4}$$

$$f = 1$$

$$1 \pi =$$

$$2. =$$

$$A = \frac{1}{4}$$

$$V = \frac{P}{\rho}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$1 = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$x = \frac{1}{2}$$

$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

Let $\mu = \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$

$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

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$$= \frac{1}{2} \left(\frac{1}{\mu} + \frac{1}{\mu'} \right)$$

$$\frac{1}{r} = \frac{a}{r^2} \left(\frac{1}{\sqrt{1 - \frac{a}{r}}} \right)$$

$$\frac{d^2 r}{dt^2} = - \frac{GM}{r^2}$$

Let

$$\frac{dr}{dt} = \dot{r}$$

$$\frac{d^2 r}{dt^2} = \frac{d\dot{r}}{dt}$$

$$\frac{d\dot{r}}{dt} = \frac{d\dot{r}}{dr} \frac{dr}{dt} = \dot{r} \frac{d\dot{r}}{dr}$$

$$\dot{r} \frac{d\dot{r}}{dr} = - \frac{GM}{r^2}$$

$$\frac{1}{2} \frac{d\dot{r}^2}{dr} = - \frac{GM}{r^2}$$

$$\frac{d\dot{r}^2}{dr} = - \frac{2GM}{r^2}$$

$$\frac{1}{2} \frac{d\dot{r}^2}{dr} = - \frac{GM}{r^2} \Rightarrow \dot{r}^2 = \frac{2GM}{r} + C$$

$$\dot{r}^2 = \frac{2GM}{r} + C \Rightarrow \dot{r} = \sqrt{\frac{2GM}{r} + C}$$

$$\frac{dr}{dt} = \sqrt{\frac{2GM}{r} + C} \Rightarrow dt = \frac{dr}{\sqrt{\frac{2GM}{r} + C}}$$

$$dt = \frac{dr}{\sqrt{\frac{2GM}{r} + C}}$$

$$dt = \frac{dr}{\sqrt{\frac{2GM}{r} + C}}$$

$$f(x) = 1$$

$$f(x) = 0$$

$$\frac{1}{m} - \frac{1}{n} = 1$$

$$f(x) = 1$$

$$f(x) = 0$$

$$\frac{1}{m} - \frac{1}{n} = 1$$

$$\frac{1}{m} - \frac{1}{n} = 1$$

$$f(x) = 1$$

$$f(x) = 0$$

$$f(x) = 1$$

$$\frac{1}{m} - \frac{1}{n} = 1$$

$$\frac{1}{m} - \frac{1}{n} = 1$$

1. $\frac{1}{x^2} = x^{-2}$

2. $\frac{1}{x^3} = x^{-3}$

3. $\frac{1}{x^4} = x^{-4}$

4. $\frac{1}{x^5} = x^{-5}$

5. $\frac{1}{x^6} = x^{-6}$

6. $\frac{1}{x^7} = x^{-7}$

7. $\frac{1}{x^8} = x^{-8}$

8. $\frac{1}{x^9} = x^{-9}$

9. $\frac{1}{x^{10}} = x^{-10}$

10. $\frac{1}{x^{11}} = x^{-11}$

11. $\frac{1}{x^{12}} = x^{-12}$

12. $\frac{1}{x^{13}} = x^{-13}$

13. $\frac{1}{x^{14}} = x^{-14}$

14. $\frac{1}{x^{15}} = x^{-15}$

15. $\frac{1}{x^{16}} = x^{-16}$

16. $\frac{1}{x^{17}} = x^{-17}$

17. $\frac{1}{x^{18}} = x^{-18}$

18. $\frac{1}{x^{19}} = x^{-19}$

19. $\frac{1}{x^{20}} = x^{-20}$

20. $\frac{1}{x^{21}} = x^{-21}$

21. $\frac{1}{x^{22}} = x^{-22}$

22. $\frac{1}{x^{23}} = x^{-23}$

23. $\frac{1}{x^{24}} = x^{-24}$

24. $\frac{1}{x^{25}} = x^{-25}$

25. $\frac{1}{x^{26}} = x^{-26}$

26. $\frac{1}{x^{27}} = x^{-27}$

27. $\frac{1}{x^{28}} = x^{-28}$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$13 \quad \frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$a_7 = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{2}$$

$$= \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{2}$$

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$$= \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{2}$$

$$= \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{2}$$

$$\frac{1}{x} = \frac{1}{\frac{1}{1.5}}$$
$$= 1.5$$

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$$= 1.5$$

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$$= 1.5$$

$$\frac{1}{x} = \frac{1}{\frac{1}{1.5}}$$
$$= 1.5$$

$$\frac{1}{2} \log \frac{1}{2} = -\frac{1}{2} \log 2$$

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$$\frac{1}{2} \log \frac{1}{2} = -\frac{1}{2} \log 2$$

$$r = \frac{1}{2}$$

$$f(r) = \frac{1}{2} \left(\frac{1}{r} - r \right)$$

$$f(r) = -\frac{1}{2} \left(\frac{1}{r} + r \right)$$

$$+ \frac{1}{2} = \frac{c}{2} \left[-\frac{1}{r} - r \right] \quad \left| \cdot \frac{1}{r} \right.$$

~~3/2~~

$$\sqrt{2 - \frac{c^2}{2}} - c' = \frac{d}{dr}$$

$$2r^2$$

$$\frac{1}{\sqrt{1 - \frac{c^2}{2}}} = \frac{d}{dr} \frac{1}{\sqrt{1 - \frac{c^2}{2} - \frac{1}{2}r^2}}$$

$$= \frac{1}{\sqrt{c}} = \frac{1}{c'} \frac{1}{2}$$

$$\theta = \frac{2}{\ln \frac{c}{c'}} \quad r \quad \text{or } \frac{1}{r}$$

$$\frac{1}{2} = \frac{1}{2}$$

$$x = 1$$

$$x = \frac{1}{2}$$

$$x = \frac{1}{2}$$

$$x = 1$$

$$x = 1$$

$$x = 1$$

$$x = 1$$

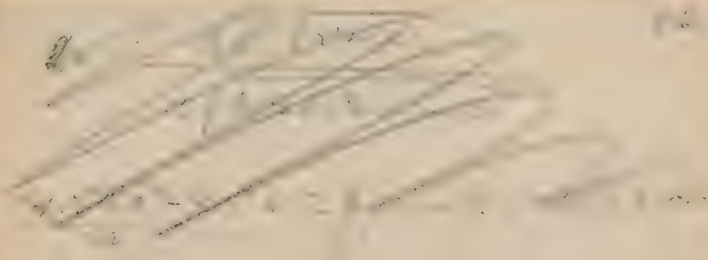
$$x = 1$$

$$x = 1$$

$$x = 1$$

2.

10



9

$$1 - \frac{1}{x^2} = \frac{x^2 - 1}{x^2}$$

$$= \frac{(x-1)(x+1)}{x^2}$$

$$= \frac{(x-1)(x+1)}{x^2}$$

$$\text{Laplace} \frac{1}{s^2 + 1} = \frac{1}{s^2 + 1}$$

$$= \frac{1 \cdot [1 - (s^2 + 1)]}{s^2 + 1} = \frac{1 - (s^2 + 1)}{s^2 + 1}$$

$$= \frac{1 - s^2 - 1}{s^2 + 1} = -\frac{s^2}{s^2 + 1}$$

$$= -\frac{s^2}{s^2 + 1} = -\frac{s^2 + 1 - 1}{s^2 + 1}$$

$$= -\frac{s^2 + 1}{s^2 + 1} + \frac{1}{s^2 + 1} = -1 + \frac{1}{s^2 + 1}$$

$$= -1 + \frac{1}{s^2 + 1}$$

$$\frac{1}{s^2 + 1} = \frac{1}{s^2 + 1} \cdot \frac{1}{1} = \frac{1}{s^2 + 1}$$

$$= \frac{1}{s^2 + 1} = \frac{1}{s^2 + 1}$$

$$\frac{1}{s^2 + 1} = \frac{1}{s^2 + 1}$$

$$\frac{1}{x^2} = x^{-2}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$\frac{d}{dx} \left(\frac{1}{x^2} \right) = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$\frac{d}{dt} = x$$

$$\frac{d^2}{dt^2} = \frac{d}{dt} \left(\frac{d}{dt} \right) = \frac{d}{dt} x$$

$$\frac{d^3}{dt^3} = \frac{d}{dt} \left(\frac{d^2}{dt^2} \right) = \frac{d}{dt} \left(\frac{d}{dt} x \right)$$

$$\frac{d^4}{dt^4} = \frac{d}{dt} \left(\frac{d^3}{dt^3} \right) = \frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} x \right) \right)$$

$$\frac{d^5}{dt^5} = \frac{d}{dt} \left(\frac{d^4}{dt^4} \right) = \frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} x \right) \right) \right)$$

$$\frac{d^6}{dt^6} = \frac{d}{dt} \left(\frac{d^5}{dt^5} \right) = \frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} x \right) \right) \right) \right)$$

$$\frac{d^7}{dt^7} = \frac{d}{dt} \left(\frac{d^6}{dt^6} \right) = \frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} x \right) \right) \right) \right) \right)$$

$$\frac{d^8}{dt^8} = \frac{d}{dt} \left(\frac{d^7}{dt^7} \right) = \frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} \left(\frac{d}{dt} x \right) \right) \right) \right) \right) \right)$$

$$= \frac{1}{t^2} \left[e^{-\frac{1}{t}} \right] = \frac{1}{t^2} \left[\frac{e^{-\frac{1}{t}}}{t} \right]$$

$$\left(\frac{d^8}{dt^8} \right) = \frac{1}{t^2} \left[\frac{1}{t} \right]^2 = \frac{1}{t^4}$$

$$\frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$\frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$\frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$\frac{1}{n}$$

$$\frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right] = \frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$\frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right] = \frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$= \frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$+ \dots + \frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$= \frac{1}{n} \left[\frac{f(x_1) + f(x_2) + \dots + f(x_n)}{n} \right]$$

$$= \frac{1}{12} \left(12 - 12 \right) - \frac{1}{2} \left(12 \right)$$

$$+ \frac{1}{12} \left(12 \right) - \frac{1}{2} \left(12 \right)$$

$$= \frac{1}{12} \left(12 \right) - \frac{1}{2} \left(12 \right)$$

$$= \frac{1}{12} \left(12 \right)$$

$$2 = 2 - \frac{dx}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$\frac{dx}{x} = \frac{dx}{x}$$

$$2 = 2 - \frac{dx}{x}$$

$$\frac{dx}{x} = \frac{dx}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$= 1 + \frac{1}{x}$$

$$\frac{dx}{x} = \frac{dx}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$\frac{dx}{x} = \frac{dx}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$\frac{1}{2} = \frac{dx}{x} + \frac{1}{x^2} = \frac{1}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$\frac{dx}{x} = \frac{dx}{x} + \frac{1}{x^2} = \frac{1}{x} + \frac{1}{x^2} \cdot \frac{dx}{x}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

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$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

10

1921-22 1922-23

[Faint handwritten notes]

$$1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 1$$

~~$$\lambda = \frac{1}{2} \left(\frac{1}{\lambda} + \frac{1}{\lambda} \right) = \frac{1}{2}$$~~

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

$$\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} \frac{d}{dt} \right)$$

$C = 2 \times 10^{-10}$

$\lambda = 0$ (1) $\lambda = 0$
 $\lambda = 0$ (2) $\lambda = 0$

$$\begin{aligned}
 & + \frac{\partial}{\partial x} \left(\frac{\partial}{\partial x} \right) - \lambda \left(\frac{\partial}{\partial x} \right) - \lambda \left(\frac{\partial}{\partial x} \right) + \\
 & + \lambda \left(\frac{\partial}{\partial x} \right) + \lambda \left(\frac{\partial}{\partial x} \right) = 0
 \end{aligned}$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

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$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$\lambda \left(\frac{\partial}{\partial x} \right) x = x \left(\frac{\partial}{\partial x} \right) \lambda$$

$$- \frac{1}{x^2} = -x^{-2}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^3}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

+

7-20

10-11-20



... 1/2 ...

1

11

$$1 - \frac{2}{1 + \sqrt{2}}$$

$$f(x) = \frac{1}{x^2} = x^{-2} \Rightarrow f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

11-1-1944

$$C_1 = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$T_{\text{eff}} = \frac{T}{K}$$

人

1891

$$y = \frac{1}{2} \left(\frac{1}{x} + \frac{1}{x^2} \right) = \frac{1}{2} (x^{-1} + x^{-2})$$

$$11. Y = -10^x \quad X = 0$$

$$\frac{dy}{dx} = -10^x$$

$$y = -10^x + C$$

$$y = -10^0 + C$$

$$y = -1 + C$$

$$12. f(x) = f_1(x) + f_2(x) + f_3(x) \quad x = 0, 1, 2, \dots$$

$$f(x) = \sum_{k=0}^{\infty} \frac{x^k}{k!} = e^x$$

$$= \sum_{k=0}^{\infty} \frac{x^k}{k!} + x + \dots = e^x - 1$$

$$v = 1$$

$$X = -N \frac{1}{1 + \frac{1}{N}}$$

$$Y = -g + N \frac{1}{1 + \frac{1}{N}}$$

$$\frac{dX}{dN} = -\frac{1}{N^2} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^2} \frac{N}{N+1}$$

$$\frac{dY}{dN} = -\frac{1}{N^2} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^2} \frac{N}{N+1}$$

$$\frac{d^2X}{dN^2} = -\frac{1}{N^3} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^3} \frac{N}{N+1}$$

$$\frac{d^2Y}{dN^2} = -\frac{1}{N^3} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^3} \frac{N}{N+1}$$

$$\frac{1}{2} \frac{d^3X}{dN^3} = -\frac{1}{N^4} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^4} \frac{N}{N+1}$$

$$\frac{1}{2} \frac{d^3Y}{dN^3} = -\frac{1}{N^4} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^4} \frac{N}{N+1}$$

$$\frac{d^4X}{dN^4} = -\frac{1}{N^5} \frac{1}{1 + \frac{1}{N}} = -\frac{1}{N^5} \frac{N}{N+1}$$

$$\frac{dA}{dt} = \frac{1}{2} \frac{d}{dt} (A^2)$$

$$\frac{d}{dt} (A^2) = 2A \frac{dA}{dt}$$

$$\frac{d}{dt} (A^2) = 2A \frac{dA}{dt} = 2A \left(-\frac{1}{2} \frac{dA}{dt} \right) = -A \frac{dA}{dt}$$

$$= -\frac{1}{2} \frac{d}{dt} (A^2)$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$A_2 = \sqrt{1-2\eta}$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$N = \frac{v^2}{c^2}$$

$$\frac{dA}{dt} = -\frac{1}{2} \frac{dA}{dt}$$

$$\frac{1}{2} = 2.0$$

$$\frac{1}{2} = 0 \quad 11.11$$

$$\frac{1}{2} = 2.2 \quad 11.11$$

$$\frac{1}{2} = 2.2$$

$$\frac{1}{2} = -2.2 - 0^2$$

$$\frac{1}{2} = -2.2 = -2.2$$

$$\frac{1}{2} = 2.2$$

$$\frac{1}{2} = 2.2 = -2.2 - 0^2$$

$$x = 2.2$$

$$y = -2.2$$

$$x = \frac{2}{3} \cdot 2.2 = 1.47$$

$$x = \frac{2}{3} \cdot 2.2 = 1.47$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

107

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

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$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

1. $\frac{1}{x^2} = x^{-2}$
 $\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$

2. $\frac{1}{x^3} = x^{-3}$
 $\frac{d}{dx} x^{-3} = -3x^{-4} = -\frac{3}{x^4}$

3. $\frac{1}{x^4} = x^{-4}$
 $\frac{d}{dx} x^{-4} = -4x^{-5} = -\frac{4}{x^5}$

4. $\frac{1}{x^5} = x^{-5}$
 $\frac{d}{dx} x^{-5} = -5x^{-6} = -\frac{5}{x^6}$

5. $\frac{1}{x^6} = x^{-6}$
 $\frac{d}{dx} x^{-6} = -6x^{-7} = -\frac{6}{x^7}$

6. $\frac{1}{x^7} = x^{-7}$
 $\frac{d}{dx} x^{-7} = -7x^{-8} = -\frac{7}{x^8}$
 $\frac{d}{dx} \frac{1}{x^7} = -\frac{7}{x^8}$

$$= \left[\frac{1}{2} \left(\frac{1}{x^2} - \frac{1}{x^3} \right) \right]_{x=1}^{x=2}$$

$$= \frac{1}{2} \left(\frac{1}{2^2} - \frac{1}{2^3} \right) - \frac{1}{2} \left(\frac{1}{1^2} - \frac{1}{1^3} \right)$$

$$= \frac{1}{2} \left(\frac{1}{4} - \frac{1}{8} \right) - \frac{1}{2} \left(1 - 1 \right)$$

$$= \frac{1}{2} \left(\frac{1}{4} - \frac{1}{8} \right) - \frac{1}{2} (0)$$

$$= \frac{1}{2} \left(\frac{1}{4} - \frac{1}{8} \right)$$

$$= \frac{1}{2} \left(\frac{2}{8} - \frac{1}{8} \right)$$

$$= \frac{1}{2} \left(\frac{1}{8} \right)$$

$$= \frac{1}{16}$$

$$\frac{1}{16} = \frac{1}{2^4} = \frac{1}{16}$$

$$\frac{1}{16} = \frac{1}{2^4} = \frac{1}{16}$$

$$\frac{1}{16} = \frac{1}{2^4}$$

$$\frac{1}{16} = \frac{1}{2^4} = \frac{1}{16}$$



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1511

$$X = \frac{1}{2} \left(\frac{1}{a} + \frac{1}{b} \right)$$

1512

$$N =$$

$$T = \frac{m}{a} \frac{1}{a} =$$

1513

$$\frac{L}{a} = \frac{1}{a}$$

1514

$$\frac{L}{a} = \frac{1}{a}$$

1515

$$\frac{L}{a} = \frac{1}{a}$$

1516

$$\frac{L}{a} = \frac{1}{a}$$

1517

$$\frac{L}{a} = \frac{1}{a}$$

1518

$$\frac{L}{a} = \frac{1}{a}$$

$$f(x) = \frac{1}{x^2} = x^{-2}$$

$$f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4}$$

$$f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{120}{x^6}$$

$$f^{(5)}(x) = -\frac{720}{x^7}$$

$$f^{(6)}(x) = \frac{5040}{x^8}$$

$$f^{(7)}(x) = -\frac{40320}{x^9}$$

$$f^{(8)}(x) = \frac{322560}{x^{10}}$$

$$f^{(9)}(x) = -\frac{2823040}{x^{11}}$$

$$f^{(10)}(x) = \frac{28230400}{x^{12}}$$

$$f^{(11)}(x) = -\frac{338764800}{x^{13}}$$

$$f^{(12)}(x) = \frac{4301747200}{x^{14}}$$



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$$y_1 = a \sin t + b \cos t - 1 + 2t$$

$$y_2 = a \sin t - 1 - 2t \cos t$$

$$y_3 = a \sin t - a \cos t \sin t$$

$$y_4 = a \sin t + a \cos t \sin t$$

$$y = \frac{1}{2} (y_1 + y_2 + y_3 + y_4)$$

$$\frac{1}{2} \frac{d}{dt} (y_1 + y_2 + y_3 + y_4) = \frac{1}{2} (a \cos t - a \sin t - a \cos t + a \sin t) = 0$$

$$y = \frac{1}{2} (y_1 + y_2 + y_3 + y_4) = \frac{1}{2} (a \sin t + b \cos t - 1 + 2t + a \sin t - 1 - 2t \cos t + a \sin t - a \cos t \sin t + a \sin t + a \cos t \sin t)$$

$$y + 2t \cos t = \frac{1}{2} (2a \sin t + 2b \cos t - 2 + 2t) = a \sin t + b \cos t - 1 + t$$

$$y + 2t \cos t = a \sin t + b \cos t - 1 + t$$

$$I \xi = 0$$

$$\eta = 1 - \xi$$

$$\Xi \eta = \eta - \xi = 1 - 2\xi$$

$$\frac{d}{dt} \left(\frac{1}{1 - 2\xi} \right) = -1$$

$$I \eta = 0$$

$$\eta = 1 - \xi$$

$$\Xi \eta = \eta - \xi = 1 - 2\xi$$

$$x^2 = \frac{1 - \xi}{2} = \frac{1}{2} - \xi$$

$$\frac{d}{dt} \left(\frac{1 - \xi}{2} \right) = \frac{1}{2} \frac{d}{dt} (1 - \xi) = \frac{1}{2} \frac{d}{dt} \left(\frac{1}{1 - 2\xi} \right) = \frac{1}{2} \frac{1}{1 - 2\xi}$$

$$\frac{d}{dt} \left(\frac{1}{1 - 2\xi} \right) = -1$$

$$\frac{d}{dt} \left(\frac{1}{1 - 2\xi} \right) = -1$$

$$\frac{d}{dt} \left(\frac{1}{1 - 2\xi} \right) = -1$$

215-2-1-1

$$- \frac{x}{y} = \frac{2}{3}$$

$$x = \frac{2}{3}y$$

$$\frac{1}{x} = \frac{3}{2y}$$

$$x = \frac{2}{3}y$$

$$\frac{1}{x} = \frac{3}{2y}$$

$$\frac{1}{x} = \frac{3}{2y}$$

Integration by parts

$\int x \cos x dx$

$$= \frac{1}{2} x^2 \cos x + \int x \sin x dx$$

$\int x \sin x dx = -x \cos x + \int \cos x dx$

$$= -x \cos x + \sin x$$

$\int x \cos x dx = \frac{1}{2} x^2 \cos x - x \cos x + \sin x$

$$= \frac{1}{2} x^2 \cos x - x \cos x + \sin x$$

$\int x \sin x dx = -x \cos x + \sin x$

$$= -x \cos x + \sin x$$

$$= \frac{1}{2} x^2 \cos x - x \cos x + \sin x$$

$\int x \cos x dx = \frac{1}{2} x^2 \cos x - x \cos x + \sin x$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$\frac{1}{1+x^2} = \frac{1}{1+x^2}$$

$$x^2 + 2x + 1 = 0$$

$$x^2 - 2x + 1 = 0$$

$$x^2 + 1 = 0$$

$$x^2 - 1 = 0$$

$$x^2 + 2x = 0$$

$$x^2 - 2x = 0$$

$$x^2 + 1 = 0$$

$$x^2 = -\frac{1}{a} - \frac{1}{b} \left[\frac{1}{c} + \frac{1}{d} \right] \left[\frac{1}{e} + \frac{1}{f} \right]$$

$$x^2 = \frac{1}{a} - \frac{1}{b} \left[\frac{1}{c} - \frac{1}{d} \right] \left[\frac{1}{e} - \frac{1}{f} \right]$$

$$x^2 = \frac{1}{a} + \frac{1}{b}$$

$$x^2 + 5x + 6 = 0$$

$$x^2 - 2x - 1 = 0$$

$$x^2 = 1 + 2 \left[\frac{1}{a} + \frac{1}{b} \right]$$

$$x^2 = \frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}$$

$$x^2 = \frac{1}{a} + \frac{1}{b}$$

$$x^2 = \frac{1}{a}$$

$$x^2 - 2x - 1 = 0$$

$$x = \frac{2 \pm \sqrt{4 + 4}}{2}$$

$$x = 1 \pm \sqrt{2}$$

$$x_1 = 1 + \sqrt{2}$$

$$x_2 = 1 - \sqrt{2}$$

$$x = \frac{2 \pm \sqrt{4 + 4}}{2}$$

$$x = 1 \pm \sqrt{2}$$

$$x_1 = 1 + \sqrt{2}$$

$$x_2 = 1 - \sqrt{2}$$

$$x = \frac{2 \pm \sqrt{4 + 4}}{2}$$

$$x^2 - 2x - 1 = 0$$

$$x = \frac{2 \pm \sqrt{4 + 4}}{2}$$

$$x_1 = 1 + \sqrt{2} \quad x_2 = 1 - \sqrt{2}$$

7.7

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2. 11.

$$= a^{\frac{1}{2}} - \frac{1}{2} a^{\frac{1}{2}} \dots \frac{1}{2} a^{\frac{1}{2}} - \dots$$

$$= a^{\frac{1}{2}} \left[a^{\frac{1}{2}} - \frac{1}{2} a^{\frac{1}{2}} \dots \right]$$

$$= a^{\frac{1}{2}} \left[a^{\frac{1}{2}} - \frac{1}{2} a^{\frac{1}{2}} \dots \right]$$

$$= a^{\frac{1}{2}} \left[a^{\frac{1}{2}} + \frac{1}{2} a^{\frac{1}{2}} - \dots \right]$$

$$+ b a^{\frac{1}{2}} a^{\frac{1}{2}} + \frac{1}{2}$$

$$= a^{\frac{1}{2}} + \left(\frac{1}{2} + b \right) a^{\frac{1}{2}} a^{\frac{1}{2}} - \dots$$

$$= a^{\frac{1}{2}} - \frac{1}{2} a^{\frac{1}{2}} b \left[a^{\frac{1}{2}} + \frac{1}{2} a^{\frac{1}{2}} \dots \right]$$

$$= \frac{1}{2} a^{\frac{1}{2}} b^2 \left[a^{\frac{1}{2}} + b^2 \left[a^{\frac{1}{2}} + \frac{1}{2} a^{\frac{1}{2}} \dots \right] \right]$$

1. The first part of the problem is to find the value of x such that $x^2 + 1 = 0$.

2. The second part is to find the value of y such that $y^2 + 1 = 0$.

$$x^2 + 1 = 0 \Rightarrow x^2 = -1 \Rightarrow x = \pm i$$

$$y^2 + 1 = 0 \Rightarrow y^2 = -1 \Rightarrow y = \pm i$$

$$x^2 + y^2 + 1 = 0 \Rightarrow x^2 + y^2 = -1$$

$$x^2 + y^2 = -1$$

$$x^2 + y^2 + 1 = 0$$

$$x^2 + y^2 + 1 = 0$$

$$x^2 + y^2 + 1 = 0$$

$$x^2 + y^2 + 1 = 0$$

$$x = \pm i, y = \pm i$$

$$x = \pm i, y = \pm i$$

$$p = m \dot{x}$$

$$-d/mR \quad \frac{d}{dt} \left(\frac{1}{R} \right) = -\frac{1}{R^2} \frac{dR}{dt}$$

$$\dot{x} = \frac{dx}{dt}$$

$$\frac{d}{dt} \left(\frac{1}{R} \right) = -\frac{1}{R^2} \frac{dR}{dt}$$

$$- \frac{1}{R^2} \frac{dR}{dt} = \frac{1}{R^2} \frac{dR}{dt}$$

$$R = \dots$$

$$R = - \frac{1}{R^2} \frac{dR}{dt} = \frac{1}{R^2} \frac{dR}{dt}$$

$$\frac{d}{dt} \left(\frac{1}{R} \right) = -\frac{1}{R^2} \frac{dR}{dt}$$

$$m \dot{x}$$

$$X = - \frac{1}{R^2} \frac{dR}{dt} + \frac{1}{R^2} \frac{dR}{dt}$$

$$\frac{1}{R^2} \frac{dR}{dt} = \frac{1}{R^2} \frac{dR}{dt} + \frac{1}{R^2} \frac{dR}{dt}$$

$$V = \frac{1}{1 + \frac{1}{2} \frac{1}{1 + \frac{1}{2} \frac{1}{1 + \dots}}}$$

$$\frac{1}{1} = \frac{1}{1 + \frac{1}{2} \frac{1}{1 + \frac{1}{2} \frac{1}{1 + \dots}}}$$

$$\left[\frac{1}{2} - \frac{1}{2} \right]$$

$$p = \frac{1}{2}$$

$$p = \frac{1}{2}$$

$$p = \frac{1}{2}$$

$$x = \frac{1}{2}$$

$$x = \frac{1}{2}$$

$$x = \frac{1}{2}$$

$$(.)$$

$$\frac{2}{1} = \frac{2}{1 - \frac{1}{2}}$$

$$x = \frac{1}{2}$$

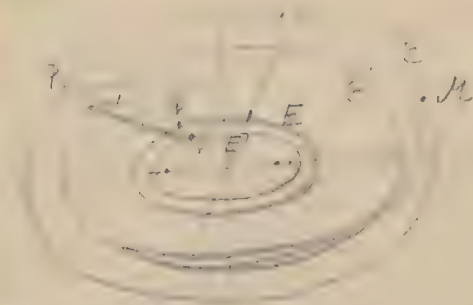
$$\frac{1}{2} = \frac{1}{2} \cdot \frac{1}{2}$$

$$\frac{1}{1 + \frac{1}{2} \frac{1}{1 + \frac{1}{2} \frac{1}{1 + \dots}}}$$

$$x = \frac{1}{2}$$

$$x = \frac{1}{2}$$

[illegible]



$$\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \quad E$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1 \quad E' \quad \text{and}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \quad E''$$

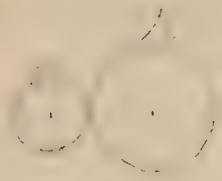
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1 \quad E'''$$

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1 \quad E''''$$

$$E = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \quad E' = \sqrt{1 - \frac{v^2}{c^2}}$$

$$E = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \quad E' = \sqrt{1 - \frac{v^2}{c^2}}$$

Let $x = \frac{1}{2}(\sqrt{2} + 1)$
then $x^2 = \frac{1}{2}(2 + \sqrt{2} + 1)$



Let $r = 1$

then $R = \frac{1}{2}(\sqrt{2} + 1)$

$$r = \frac{R^2 - 1}{2R}$$

$$\frac{1}{2} = \frac{R^2 - 1}{2R} \Rightarrow R^2 - 1 = R \Rightarrow R^2 - R - 1 = 0$$

$$R = \frac{1 \pm \sqrt{1 + 4}}{2} = \frac{1 \pm \sqrt{5}}{2}$$

Since $R > 0$, we take the positive root

$$R = \frac{1 + \sqrt{5}}{2}$$

Therefore, the radius of the larger circle is $\frac{1 + \sqrt{5}}{2}$.

$$H_1 + H_2 = 2H_0$$

$$H_1 = H_2$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

$$H_1 = H_2 = H_0$$

4-8

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{d}{dt} \left(\frac{1}{2} m \left(\frac{dx}{dt} \right)^2 \right)$$

$$= m \frac{dx}{dt} \frac{d^2x}{dt^2} = m v \frac{d^2x}{dt^2}$$

$$= \frac{d}{dt} \left(\frac{1}{2} m v^2 \right)$$

$$v' = v + \frac{dv}{dt} \Delta t$$

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = m v \frac{dv}{dt}$$

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = X \cdot \frac{dx}{dt}$$

$$\frac{d}{dt} = u$$

$$u = \frac{dx}{dt}$$

$$u = \frac{dx}{dt}$$

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{d}{dt} \left(\frac{1}{2} m \left(\frac{dx}{dt} \right)^2 \right)$$

$$u \frac{du}{dt} + u \frac{d}{dt} \left(\frac{1}{2} m \right) = \frac{d}{dt} \left(\frac{1}{2} m \right) = X - \frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} m \right)$$

$$u = \frac{dx}{dt}$$

$$\frac{d}{dt} \left(\frac{1}{2} m \right) = \frac{d}{dt} \left(\frac{1}{2} m \right) = \frac{d}{dt} \left(\frac{1}{2} m \right)$$

$$(1 - \frac{1}{2} \frac{d}{dx}) \frac{1}{x} = \frac{1}{x} - \frac{1}{2} \frac{1}{x^2}$$

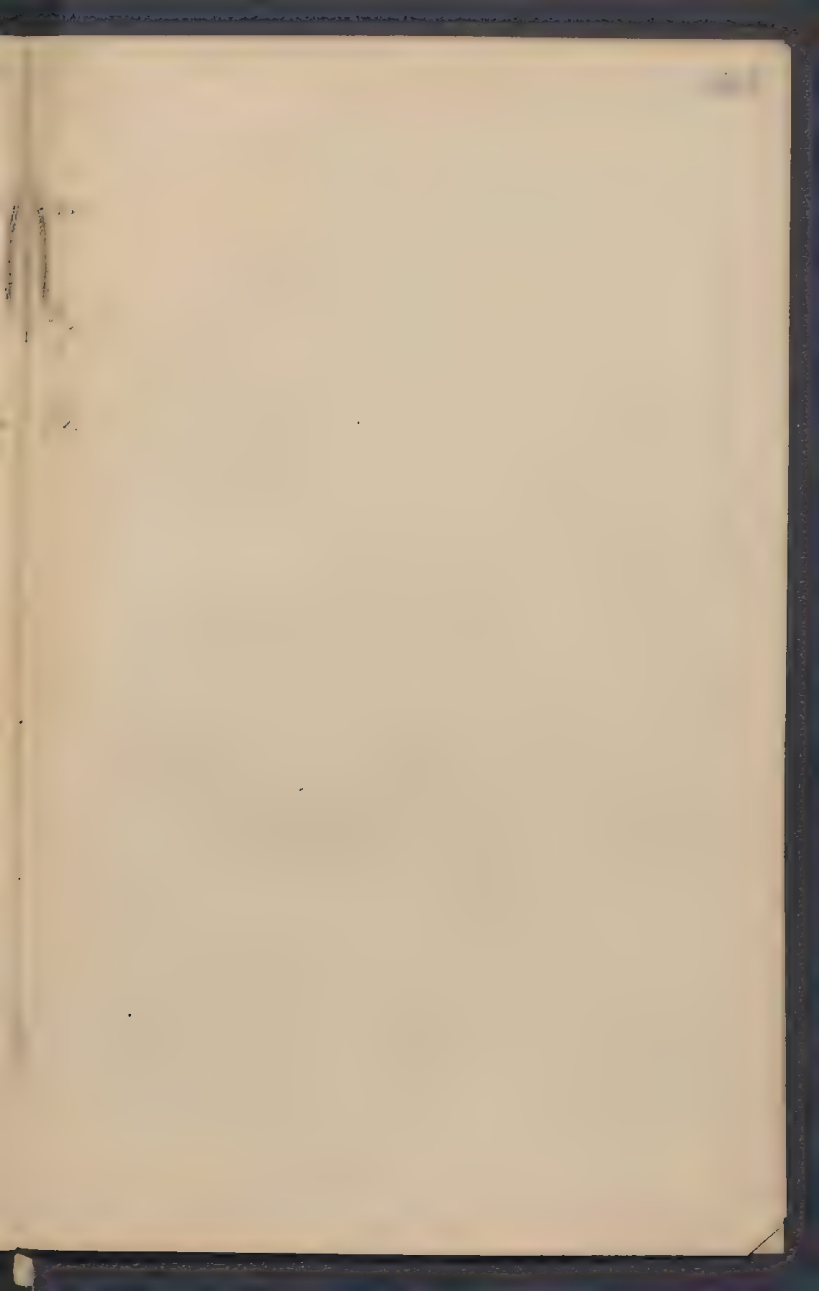
$$\frac{1}{x} - \frac{1}{2} \frac{1}{x^2} = \frac{1}{x} - \frac{1}{2} \frac{1}{x^2}$$

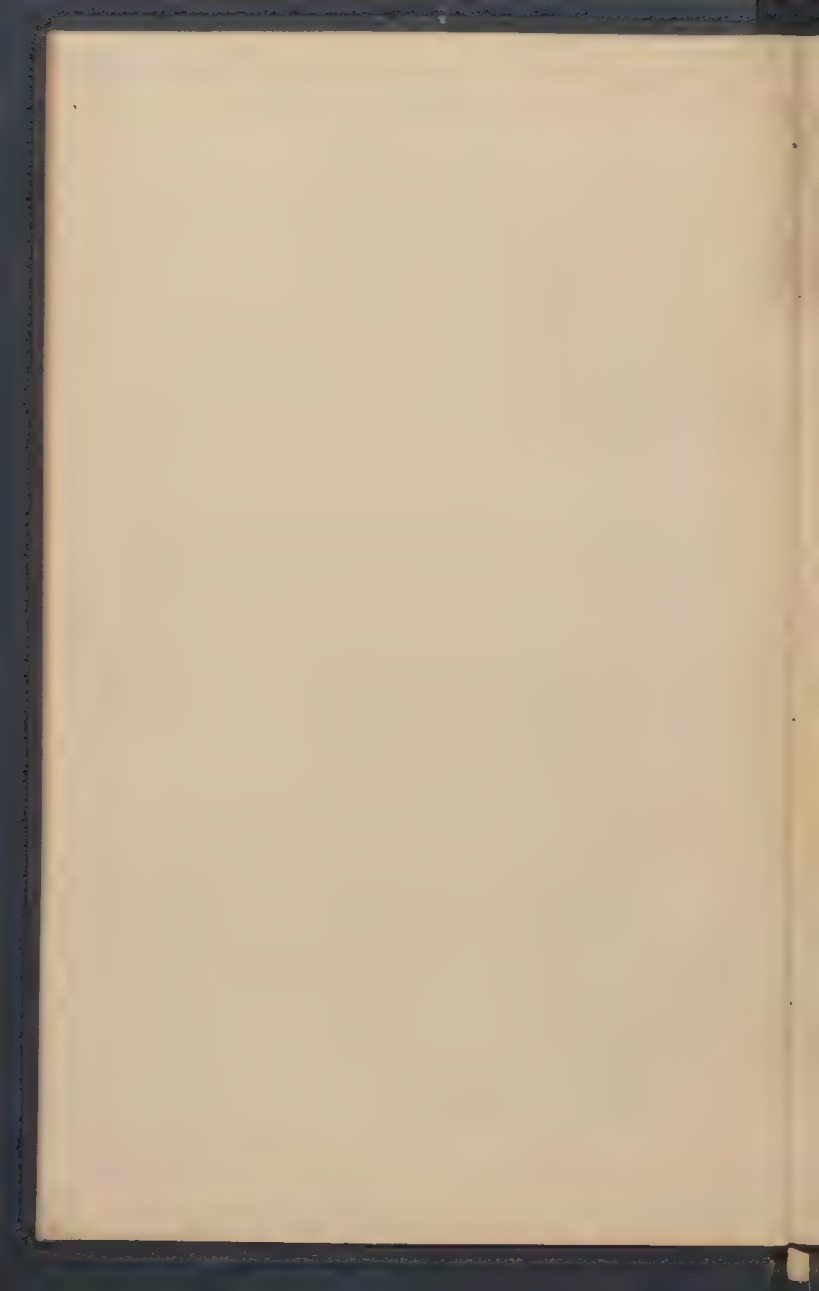
$$\frac{1}{x} - \frac{1}{2} \frac{1}{x^2} = \frac{1}{x} - \frac{1}{2} \frac{1}{x^2}$$

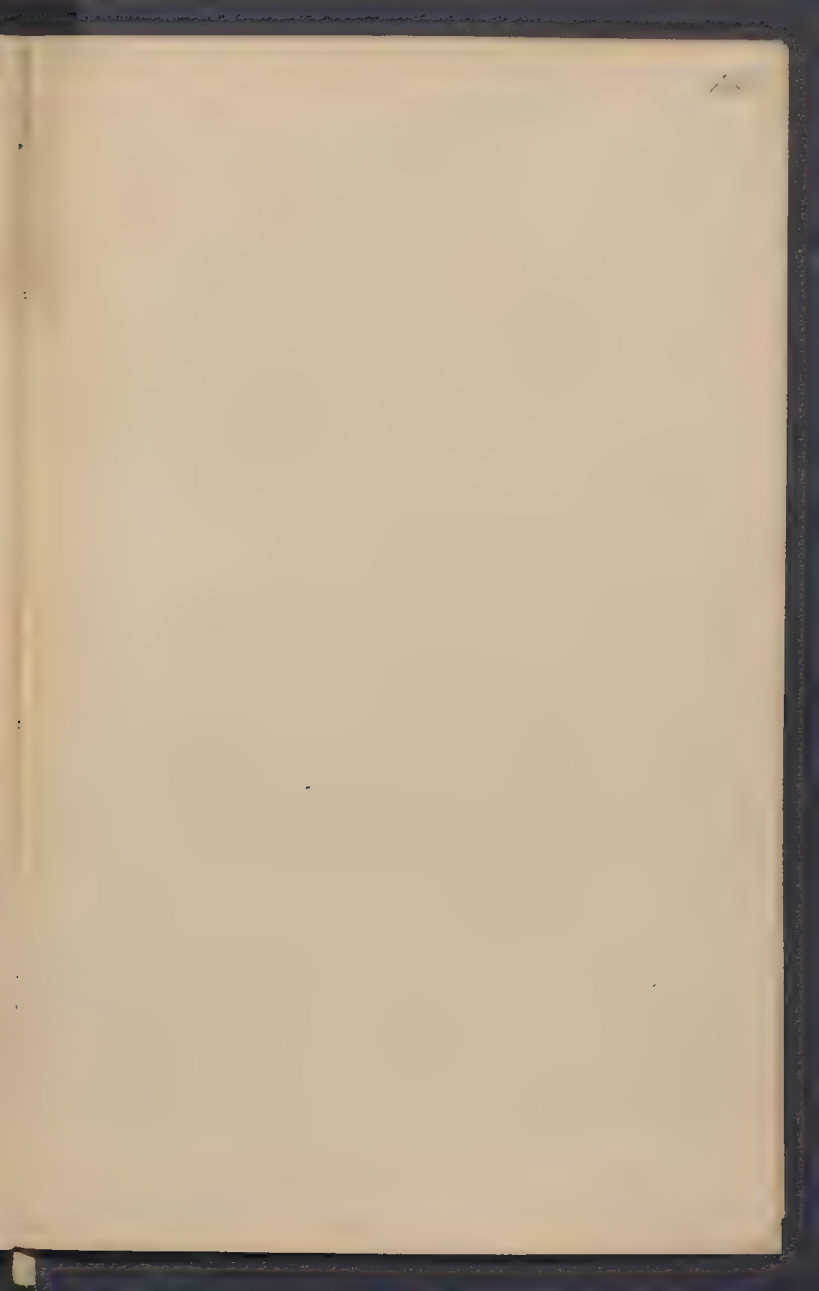
$$\frac{1}{x} - \frac{1}{2} \frac{1}{x^2} = \frac{1}{x} - \frac{1}{2} \frac{1}{x^2}$$

$$d \left(\frac{1}{x} + \frac{1}{2} \frac{1}{x^2} \right) = -\frac{1}{x^2} - \frac{1}{x^3} dx$$

$$\frac{1}{x} + \frac{1}{2} \frac{1}{x^2} = \frac{1}{x} + \frac{1}{2} \frac{1}{x^2}$$











$$m = \frac{h \cdot \cancel{A} \cdot [6.2 \cdot 10^{-8}]^3}{0.00062} \cdot 10^3$$

$$R \approx 0$$

$$A = v_0^2 - \frac{2v_0}{n_0}$$

$$\frac{2v_0}{n_0} = v_0^2$$

$$v_0 = \sqrt{2Kn_0}$$

$$\sigma_{cr} = [1] 0.00001 \text{ cm}$$

$$= 10^{-5}$$

$$\frac{1}{n^2} = K = \frac{m h}{n^2}$$

$$K_m = K_B = \frac{m h}{10^{-10} 4} \cdot \frac{R \cdot 3.56}{R - 16^3}$$

$$K_m = 10^3 = \frac{m}{4 \cdot 10^{-10}} \cdot \frac{17.6400 \cdot 10^5}{10^3}$$

$$\begin{array}{r} 9719 \\ 850 \cdot 9 \cdot 5 \\ \hline 5950 \\ 9250 \\ \hline 64000 \end{array}$$

$$K_m = \frac{10^3 [6.2 \cdot 10^{-8}]^3 \cdot 0.07}{4 \cdot 10^{-10} \cdot 0.00062 \cdot 10^3 \cdot 17.64 \cdot 10^7 \cdot 10^5}$$

$$\begin{array}{r} 36 \\ 644 \\ \hline 3844 \\ 23064 \\ 2088 \\ \hline 28328 \end{array}$$

$$v_0 = \frac{2 \cdot 38 \cdot 2}{68.9 \cdot 10^4} = \frac{1}{109}$$

